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Draft Environmental Assessment
Employee Housing

Community Plans for Canyon Village,
East Entrance, Grant Village,
Madison Junction, Norris Junction,
Northeast Entrance, South Entrance,
Tower Junction, West Entrance

Yellowstone National Park
Idaho / Montana / Wyoming

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DRAFT ENVIRONMENTAL ASSESSMENT

for
COMMUNITY PLANS for
CANYON VILLAGE/EAST ENTRANCE/GRANT VILLAGE/MADISON JUNCTION/NORRIS JUNCTION/NORTHEAST ENTRANCE/SOUTH ENTRANCE/TOWER JUNCTION/WEST ENTRANCE

Idaho/Montana/Wyoming

UNITED STATES DEPARTMENT OF INTERIOR/NATIONAL PARK SERVICE
April 1992

SUMMARY

This Draft Environmental Assessment evaluates the impacts of improving employee housing and some support facilities at Canyon Village, East Entrance, Grant Village, Madison Junction, Norris Junction, Northeast Entrance, South Entrance, Tower Junction and West Entrance in Yellowstone National Park. A full range of alternatives, including a proposed action, have been analyzed for each of the nine areas.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

GUIDE TO USE OF THIS DOCUMENT 1

INTRODUCTION

Purpose and Need 1

Maps

- Rocky Mountain Region 5
- Vicinity Map 6
- Yellowstone National Park 7

Community Planning in Yellowstone 8

Legislative Authority 11

Table

- Parkwide Employee Numbers 12

Yellowstone National Park Description

- Natural Resources 13
- Threatened and Endangered Species 17
- Cultural Resources 18
- Social and Economic Resources 19
- Visitor Use 21

CANYON VILLAGE

Purpose and Need 25

Alternatives 27
- Alternatives Considered but Rejected 27
- No-Action Alternative 27
- The Proposal 28
- Alternative One 29
- Alternative Two 30

Affected Environment and Environmental Consequences 31
- Natural Resources 31
  - *Soils and Geology* 31
  - *Vegetation* 33
  - *Wildlife* 35
  - *Threatened and Endangered Species* 36
  - *Floodplains and Wetlands* 37
  - *Water Quality* 37
  - *Fisheries* 39
  - *Air Quality* 39
  - *Visual Quality* 40

- Cultural Resources 41

- Social and Economic Resources 42
  - *Visitor Use* 42
  - *National Park Service and Concessioner Operations* 43

Maps

- Existing Conditions 47
- Areas Considered for Development 48
- The Proposal 49
- Alternative One 50
- Alternative Two 51

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EAST ENTRANCE

Purpose and Need 52

Alternatives 53
- Alternatives Considered but Rejected 53
- No-Action Alternative 53
- The Proposal 54

Affected Environment and Environmental Consequences 55
- Natural Resources 55
  - *Soils and Geology* 55
  - *Vegetation* 57
  - *Wildlife* 58
  - *Threatened and Endangered Species* 59
  - *Floodplains and Wetlands* 59
  - *Water Quality* 60
  - *Fisheries* 61
  - *Air Quality* 61
  - *Visual Quality* 62

- Cultural Resources 63

- Social and Economic Resources 63
  - *Visitor Use* 63
  - *National Park Service Operations* 64

Maps

- Existing Conditions 66
- Areas Considered for Development 67
- The Proposal 68

GRANT VILLAGE

- **Purpose and Need** 69
- **Alternatives** 70
  - Alternatives Considered but Rejected 70
  - No-Action Alternative 71
  - The Proposal 71
  - Alternative One 73
  - Alternative Two 74
- **Affected Environment and Environmental Consequences** 76
  - Natural Resources 76
    - *Soils and Geology* 76
    - *Vegetation* 77
    - *Wildlife* 79
    - *Threatened and Endangered Species* 81
    - *Floodplains and Wetlands* 81
    - *Water Quality* 81
    - *Fisheries* 82
    - *Air Quality* 83
    - *Visual Quality* 84

  - Cultural Resources 85
  - Social and Economic Resources 86
    - *Visitor Use* 86
    - *National Park Service and Concessioner Operations* 87

Maps

Park Employee Housing

- Existing Conditions 91
- Areas Considered for Development 92
- The Proposal 93
- Alternative One 94
- Alternative Two 95

Concessioner Employee Housing

- Existing Conditions 96
- Areas Considered for Development 97
- The Proposal 98
- Phasing Plan for The Proposal 99
- Alternative One 100

MADISON JUNCTION

Purpose and Need 101

Alternatives 102
  Alternatives Considered but Rejected 102
  No-Action Alternative 103
  The Proposal 103
  Alternative One 104
  Alternative Two 105

Affected Environment and Environmental Consequences 107
  Natural Resources 107
    Soils and Geology 107
    Vegetation 109
    Wildlife 110
    Threatened and Endangered Species 112
    Floodplains and Wetlands 112
    Water Quality 112
    Fisheries 114
    Air Quality 114
    Visual Quality 115

  Cultural Resources 116

  Social and Economic Resources 117
    Visitor Use 117
    National Park Service Operations 118

Maps

  Existing Conditions 120
  Areas Considered for Development 121
  The Proposal 122
  Alternative One 123
  Alternative Two 124

NORRIS JUNCTION

Purpose and Need 125

Alternatives 126
- Alternatives Considered but Rejected 126
- No-Action Alternative 127
- The Proposal 127
- Alternative One 128
- Alternative Two 129

Affected Environment and Environmental Consequences 130
- Natural Resources 130
  - *Soils and Geology* 130
  - *Vegetation* 132
  - *Wildlife* 134
  - *Threatened and Endangered Species* 135
  - *Floodplains and Wetlands* 136
  - *Water Quality* 136
  - *Fisheries* 138
  - *Air Quality* 138
  - *Visual Quality* 139

- Cultural Resources 140

- Social and Economic Resources 141
  - *Visitor Use* 141
  - *National Park Service Operations* 142

Maps

- Existing Conditions 144
- Areas Considered for Development 145
- The Proposal 146
- Alternative One 147
- Alternative Two 148

NORTHEAST ENTRANCE

Purpose and Need 149

Alternatives 150
- Alternatives Considered but Rejected 150
- No-Action Alternative 150
- The Proposal 151
- Alternative One 152

Affected Environment and Environmental Consequences 153
- Natural Resources 153
  - *Soils and Geology* 153
  - *Vegetation* 155
  - *Wildlife* 156
  - *Threatened and Endangered Species* 157
  - *Floodplains and Wetlands* 158
  - *Water Quality* 159
  - *Fisheries* 160
  - *Air Quality* 160
  - *Visual Quality* 161

- Cultural Resources 162

- Social and Economic Resources 163
  - *Visitor Use* 163
  - *National Park Service Operations* 164

Maps

- Existing Conditions 165
- Areas Considered for Development 166
- The Proposal 167
- Alternative One 168

X

SOUTH ENTRANCE

Purpose and Need 169

Alternatives 170
- Alternatives Considered but Rejected 170
- No-Action Alternative 171
- The Proposal 171
- Alternative One 172
- Alternative Two 173

Affected Environment and Environmental Consequences 174
- Natural Resources 174
  - *Soils and Geology* 174
  - *Vegetation* 176
  - *Wildlife* 178
  - *Threatened and Endangered Species* 179
  - *Floodplains and Wetlands* 179
  - *Water Quality* 180
  - *Fisheries* 181
  - *Air Quality* 182
  - *Visual Quality* 183
- Cultural Resources 183
- Social and Economic Resources 184
  - *Visitor Use* 184
  - *National Park Service Operations* 185

Maps

- Existing Conditions 187
- Areas Considered for Development 188
- The Proposal 189
- Alternative One 190
- Alternative Two 191

TOWER JUNCTION

- **Purpose and Need** 192
- **Alternatives** 194
  - Alternatives Considered but Rejected 194
  - No-Action Alternative 195
  - The Proposal 195
  - Alternative One 198
  - Alternative Two 200
- **Affected Environment and Environmental Consequences** 203
  - Natural Resources 203
    - *Soils and Geology* 203
    - *Vegetation* 205
    - *Wildlife* 207
    - *Threatened and Endangered Species* 208
    - *Floodplains and Wetlands* 208
    - *Water Quality* 210
    - *Fisheries* 212
    - *Air Quality* 212
    - *Visual Quality* 213
  - Cultural Resources 215
  - Social and Economic Resources 218
    - *Visitor Use* 218
    - *National Park Service and Concessioner Operations* 219

Maps

- Existing Conditions 222
- Areas Considered for Development 223
- The Proposal 224
- Alternative One 225
- Alternative Two 226

WEST ENTRANCE

Purpose and Need 227

Alternatives 229
  Alternatives Considered but Rejected 229
  No-Action Alternative 229
  The Proposal 230
  Alternative One 231
  Alternative Two 233

Affected Environment and Environmental Consequences 235
  Natural Resources 235
    Soils and Geology 235
    Vegetation 237
    Wildlife 239
    Threatened and Endangered Species 240
    Floodplains and Wetlands 240
    Water Quality 241
    Fisheries 242
    Air Quality 242
    Visual Quality 243

  Cultural Resources 244

  Social and Economic Resources 245
    Visitor Use 245
    National Park Service and Concessioner Operations 246

Maps

  Existing Conditions 248
  Areas Considered for Development 249
  The Proposal 250
  Alternative One 251
  Alternative Two 252

THREATENED AND ENDANGERED SPECIES 253
  Figure 1 257
  Table 1 260
  Table 2 262
  Table 3 263

CUMULATIVE EFFECTS ANALYSIS OF THE PROPOSALS 285

PLANNING TEAM 290

AGENCIES CONSULTED 290

BIBLIOGRAPHY 291

ESTIMATED DEVELOPMENT COSTS 299

EXECUTIVE SUMMARY

Yellowstone National Park is one of America's largest parks. Given its large size, several communities have been established in the interior of Yellowstone in order to adequately provide for protection of the park's resources and its visitors. Employee housing for National Park Service and concessioner personnel is deficient in quantity and quality in many of these communities, lessening the ability of the National Park Service to fulfill its mission in the park. Community plans have been prepared for nine of these areas in order to provide more adequate housing and where necessary improving substandard support facilities, such as maintenance facilities, utilities, and offices. Although each community plan, and its accompanying environmental assessment, has been prepared and evaluated independently, all nine plans and assessments have been combined in this document in order to more fully understand the cumulative effects of the proposed actions.

The community plans have been developed over the past three years. The National Park Service began the planning process with a comprehensive evaluation of existing housing and site conditions in each of the nine communities. At the same time, a systematic evaluation of staff needs for National Park Service and concession employees serving the park was made. This study took into account anticipated trends in visitor use and resource protection needs. Additionally, a sociological study of the existing communities and employee expectations and needs was prepared. Based upon the results of these evaluations, a general determination of quantities and locations for future housing was made.

Next, extensive site-specific studies were undertaken to determine exactly how housing and support facilities could be most effectively integrated into existing communities. The proposed action for each area has been determined to have the least impact on the resources of the park while providing for the necessary improvements. These improvements are expected to occur over the next 10 to 15 years, as funding becomes available.

An environmental assessment has been prepared for each of the proposed actions (as well as for no-action and alternative scenarios) for the nine communities. In addition, an evaluation of the cumulative impacts of the proposed actions was made. Generally, no substantial impacts have been found. This is primarily due to the fact that most improvements would occur within existing developed areas; however, some new disturbance of resources is expected to occur. While impacts are not expected to be significant overall, numerous mitigation actions within each community would be required prior to, during and following any construction activity, in order to minimize impacts on natural, cultural, sociological and economic resources. These mitigation actions are noted throughout this assessment.

GUIDE TO USE OF THIS DOCUMENT

This document begins with a discussion of the current employee housing situation in Yellowstone National Park, followed by a description of the process used to create appropriate community plans for nine areas in the park and a general description of the park itself. Each community plan for the nine individual areas (Canyon Village, East Entrance, etc.) is then described and assessed in an independent chapter. Following these chapters is an assessment of impacts on threatened and endangered species within all nine individual areas. Then a cumulative effects analysis on roads, recreation, concessions, wilderness, grazing, mining, timber harvest and grizzly bears is discussed. A listing of people and agencies involved in the preparation of this document, resources consulted, and projected costs for improvements is included at the end of the document.

INTRODUCTION

PURPOSE AND NEED

The American public first became aware of the many intriguing natural features in the Yellowstone area in the early 1800s. Since the establishment of Yellowstone National Park in 1872, numerous National Park Service directives have been issued which have established the level of development necessary to allow people to appreciate this natural wonder. As early as 1883 hotels were provided within the park to allow for overnight stays of visitors. With these earliest developments, it was recognized that housing for employees must also be provided within the park in order to properly serve visitors and protect the resource in these remote locations.

During the first forty years of the park's existence, pressures from illegal uses of park resources necessitated that federal troops be stationed in facilities within the park to protect those resources. Upon formation of the National Park Service (NPS) in 1916, military personnel were withdrawn from the park and the new civilian agency took over. The NPS has a dual obligation to preserve the natural condition of the park while providing for visitor's enjoyment of the park.

In order to fulfill this obligation, much of the park has been preserved in its natural state. In order to ensure that this continues, master planning for the park has led to designation of a "Natural Zone" and a "Park Development Zone." All visitor support and transportation facilities must be located within the "Park Development Zone," which encompasses less than ten percent of the park and, in fact, only one percent of the park is currently used for these purposes.

As visitation to the park increased over the decades, the number of visitor facilities grew; the facilities needed to protect the park resources also increased. However, supplying employee housing has usually received a lower priority than providing facilities for visitors or protecting the resources of the park. By current estimates, over two-thirds of existing employee housing presently fails to meet basic health, safety, sanitary, electrical, and building codes. In addition, there are often simply not enough employee quarters available to meet the housing needs. As a result, not enough employees can be hired or employees are forced to commute long distances, increasing pollution and congestion on already crowded park roads. This situation is not new and has been addressed with major remedial programs twice in the past. The first of these park development programs occurred during the 1920's, followed by the Civilian Conservation Corps (CCC) era of the late 1930's when numerous cabins, bunkhouses and lodges were built. Thirty years later, the Mission 66 program (completed in 1966) was initiated to increase the number of available employee housing units. The facilities built during these programs now have a number of deficiencies; the CCC cabins are considered too small and inadequate for year-round use and the Mission 66 units are considered physically inadequate and visually intrusive by today's standards.

Since the Mission 66 program, and through the present, other housing needs which have arisen have been resolved with "temporary" solutions, often with inappropriate placement of inadequate and visually incompatible structures such as mobile homes, transa-homes, and recreational vehicles (RVs). These "temporary" solutions are still being used. At the same time, not enough housing is available in appropriate locations, resulting in a shortage of employees to serve visitors and protect the park. Given the deficiencies of these three programs (CCC, Mission 66, and "temporary" housing), the bulk of existing housing is in poor condition. This causes a drain on park maintenance funds and a decline in employee morale and retention. It also presents a deterrent to recruitment of new employees.

Since the Mission 66 program was completed, park visitation has increased by approximately one million visits to 2,957,856 visitors in 1991. Increased visitation has brought a corresponding need for increased visitor protection to provide for adequate response time for accidents and law enforcement related activities (both have significantly increased in occurrence over the past 20 years). More visitation also means more wear upon visitor facilities, roads, trails and historic structures. This requires additional time and staff.

In that same time period, the National Park Service's roles and responsibilities have also increased significantly: the National Environmental Policy Act of 1969 has increased administrative requirements and staff time; there is a continuing increase in emphasis on research and resource management, requiring many new staff positions; and Visitor Center hours have been extended, both on a daily and seasonal basis, again requiring additional staff.

Over the past 20 years, winter use has increased from almost no winter visitation to over 100,000 visitors. These changes have necessitated increased winter staffing to protect the resource and provide the essential visitor services. Severe climatic conditions create maximum demands on facilities. This requires an on-site presence and considerable maintenance time and effort. In addition, roads and trails need to be plowed and groomed. Most existing quarters have not been winterized since they had been needed only during the warmer summer months.

Because of these various increased responsibilities as well as the increase in visitation since 1966, the park staff has increased from 517 to 752 persons (1991). However, this number is not considered adequate to properly manage the park. Because of budget constraints over the past 20 years, adequate staffing has not been possible. Construction and staffing are dependent upon receiving sufficient Congressional appropriations. It is imperative that housing be available both in quantity and quality if funding for additional staff becomes available.

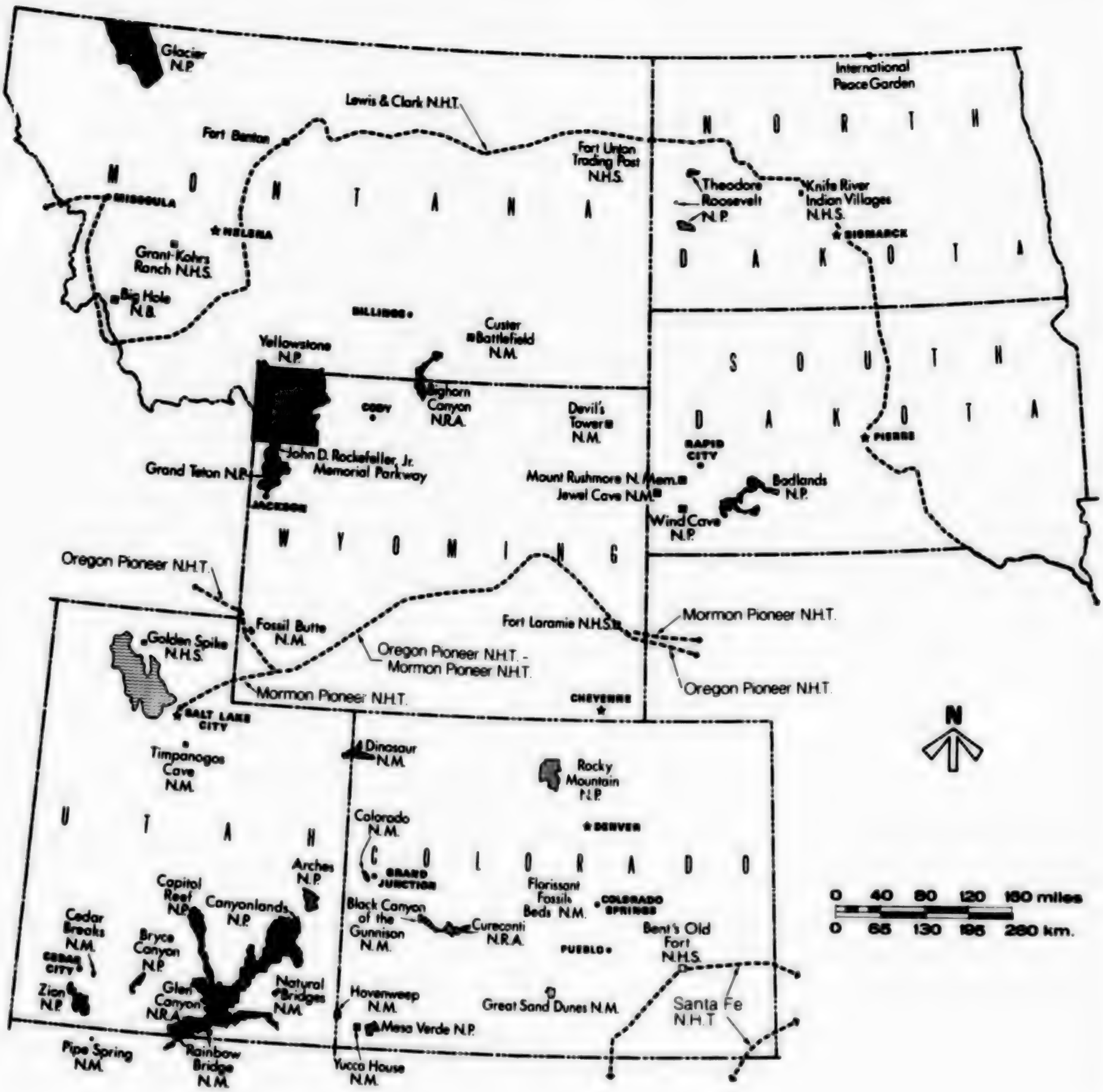
YEAR	PARK VISITATION	NPS STAFF
1966	2,165,820	517
1991	2,957,856	752

In addition to employee housing, other facilities are needed to support visitor use. These include maintenance facilities, ranger facilities for visitor protection and emergency services, interpretive facilities, research facilities, and utilities. Where these facilities have been determined to be inadequate to meet existing needs, improvements have also been included as part of planning for these nine communities.

Concessioner housing needs have also increased. There is a plan to reduce managements' work week to five days which will require additional staff. In addition, the length of the work season has expanded. This means that people live in a housing unit for longer periods of time and, consequently their tolerance for substandard quarters is less. Demographics of the work force have also changed; employees tend to be older and bring their spouses with them, requiring additional living space.

The National Park Service approved a Housing Initiative in the late 1980s. This Initiative authorized both planning and construction programs for employee housing in the national parks. The planning portion of the Initiative includes preparation of a housing assessment report, a housing needs survey, a staffing needs assessment, and development of a community plan. For Yellowstone, the housing needs survey was completed in 1990, the study of employee needs was completed in 1991, and this Environmental Assessment is being prepared to evaluate the community plans prepared for nine communities within the park.

The proposed action for each of the nine communities can generally be evaluated on its own merits. Therefore, each of the chapters could be viewed as an independent environmental assessment. The one exception to this is the assessment of effect on threatened and endangered species. Because agencies are required to protect and recover *populations* of threatened and endangered species, it is necessary to evaluate and assess impacts to threatened and endangered species on a recovery area basis rather than on a community by community basis in order to be biologically meaningful. Population recovery areas for threatened and endangered species are well defined but encompass a much larger area than the separate communities. The actions proposed in this document may have minimal impact at one particular community; however, the combined impacts of these proposals could have a significant impact upon the overall recovery of the threatened and endangered species. Therefore, it is necessary to assess threatened and endangered species holistically, in a separate chapter, in order to assess the impacts of the proposed actions upon the populations' overall recovery area.



Legend

- • Locations of Major Cities
- * Locations of State Capitals
- ⌐ State Boundary Lines
- ■ National Park Service Areas
- ----- National Park Service Historical Trails

ROCKY MOUNTAIN REGION

National Park Service

United States Department of the Interior

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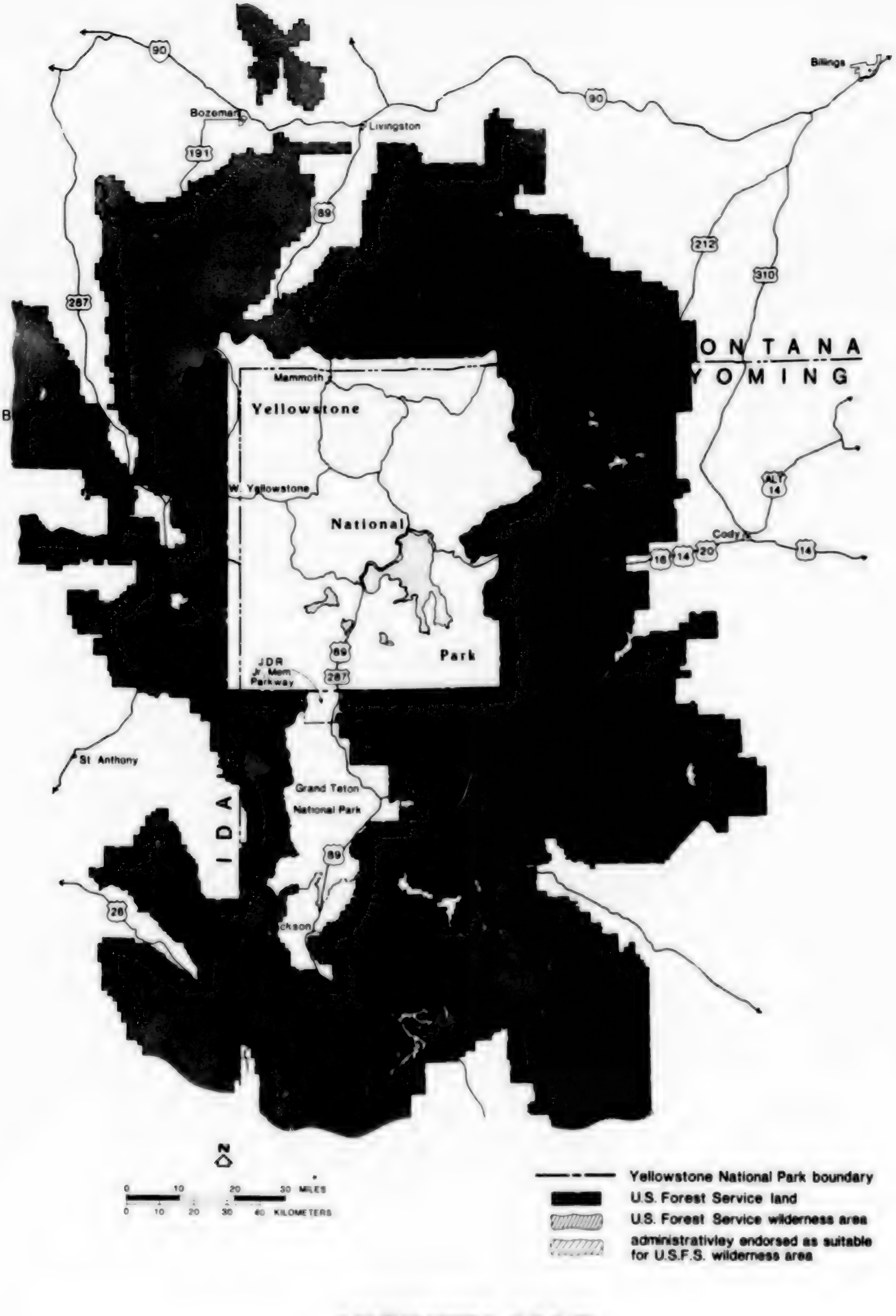
Nov '86 | RMRO

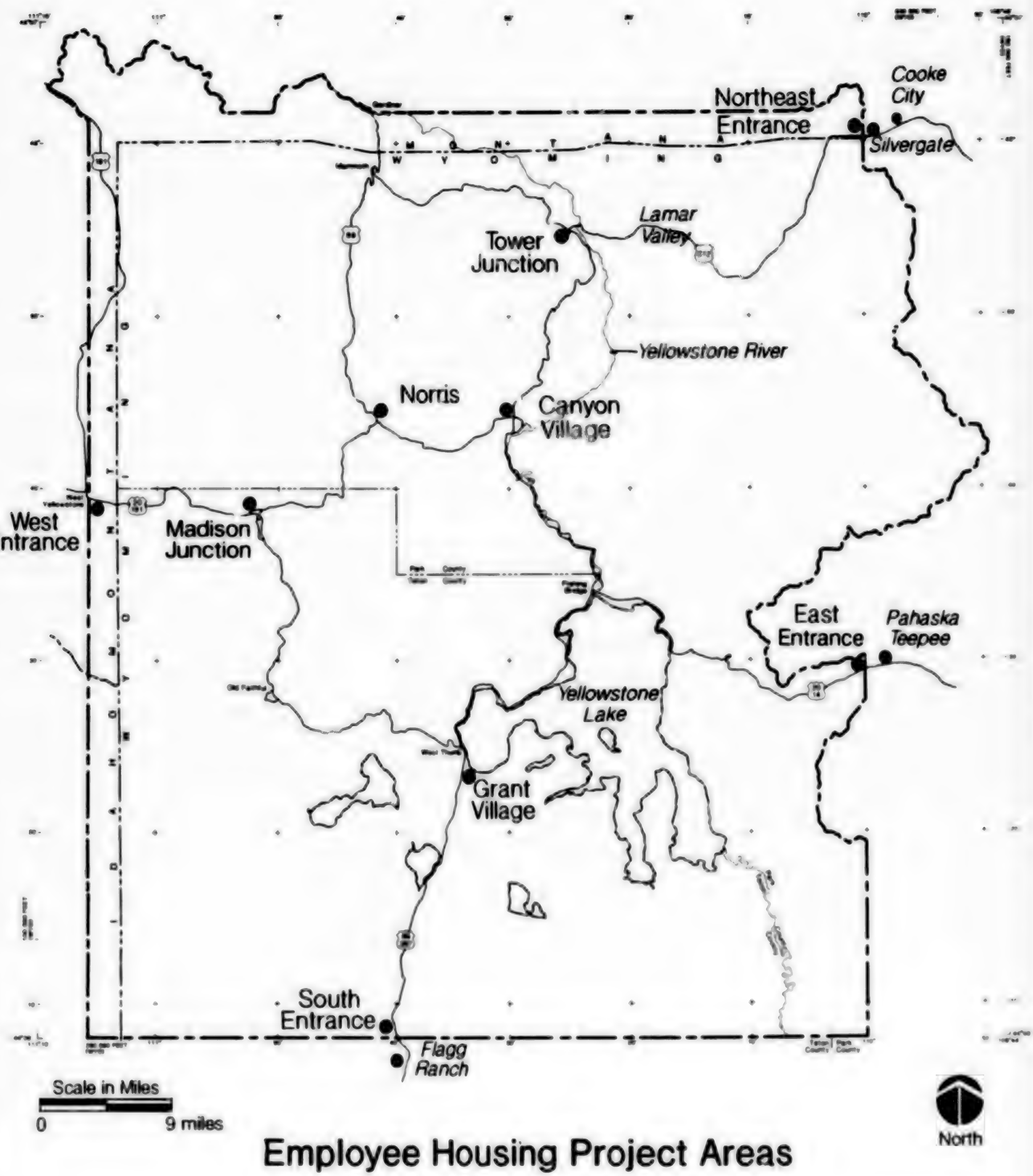


VICINITY MAP

YELLOWSTONE NATIONAL PARK

United States Department of the Interior - National Park Service

101 | 80,019
JULY 84 RMRO



Employee Housing Project Areas

YELLOWSTONE NATIONAL PARK

101/40268/May 92

COMMUNITY PLANNING IN YELLOWSTONE

Community planning efforts for housing in the developed areas of Yellowstone National Park began in the summer of 1989. Community planning studies were necessary to properly locate new housing units (and those units which would replace mobile homes) in areas that would not negatively impact the visitor experience, park operations, or, most importantly, park resources. The areas studied include Canyon Village, East Entrance, Grant Village, Madison Junction, Norris, Northeast Entrance, South Entrance, Tower Junction, and West Entrance.

The planning process began with a general determination of feasible locations for proposed housing. Five of the areas under consideration (Madison Junction, Norris, Tower Junction, Canyon Village and Grant Village) are 15 to 50 miles from the nearest town outside the park. For these areas, it was determined that employee housing would be provided within the existing developed areas, in order to avoid extensive commuting on park roads.

Four other areas (West Entrance, South Entrance, East Entrance and Northeast Entrance) are located near towns or developments outside the park. However, for a combination of reasons, it was determined that employee housing would be improved in existing developed areas instead of locating housing in towns outside the park. For all four areas, the following considerations contributed to this determination:

1. The National Park Service has no authority to build improvements on land not under federal ownership.

2. Available lands that are under federal ownership would need to be leased by the National Park Service. This would increase costs to the NPS. In addition, many of these lands do not have infrastructure (roads and utilities) available. Infrastructure construction would increase disturbance of the natural resource and would increase costs to the NPS, while duplicating much of the infrastructure already in place within the park.

3. Renting of private facilities would not be a reasonable long-term investment for the NPS.

4. The sense of community desired by many employees in these isolated areas would be weakened if employees were living in several locations within a town and/or the park.

5. Employees needed for emergency situations would be able to respond most effectively by living at their assigned work locations.

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6. Should all employees and facilities be removed from these four areas, reclamation of the areas to a natural state would take substantial funds, which are not likely to be forthcoming, and many years. The general environment of these four areas is not known to provide substantial sensitive or critical habitat (although South Entrance contains a small wetlands area and East Entrance and Northeast Entrance are in good grizzly bear habitat); reclamation of these areas would not significantly enhance the survival of any known species or ecosystems.

Additionally, in the East Entrance area no developable land exists in the nearby settlement of Pahaska Teepee, and all other lands in nearby valley areas are in good grizzly bear habitat. Therefore, it was determined that the least amount of disturbance to the natural environment would occur by developing within the existing disturbed zone at the East Entrance.

For the South Entrance, the potential exists that employee housing for both South Entrance and the John D. Rockefeller, Jr. Memorial Parkway could be combined at the Flagg Ranch complex (two miles south of South Entrance). This alternative is now under study. If both Parks agree to combine facilities at Flagg Ranch, the proposed action for South Entrance evaluated in this document would be superseded. Development would not occur at South Entrance if it is conclusively determined that South Entrance operations and employee facilities could be accommodated at Flagg Ranch.

The planning process continued with community meetings at which employees expressed their ideas, concerns, and desires about housing issues and community needs. Meetings were held throughout the various stages of the planning process to solicit input from park employees.

A study by Montana State University sociologist Patrick C. Jobes was also completed in the initial stages of the planning process. He conducted surveys of community residents and selected staff members to gain an understanding of employee needs and satisfaction/dissatisfaction with government housing and the National Park Service community. The resulting report, titled "Residential and Community Satisfaction Among Yellowstone National Park Employees," identified community needs and housing concerns and gave direction for management decisions related to Yellowstone housing. The report and information from the surveys was also used in the preparation of schematic alternatives for the community plans.

In general, Jobes' studies revealed a number of tangible steps which could be taken to improve employee living conditions. When addressing planning concerns, employees consistently requested some separation of units housing employees with different demographics and associated lifestyles (year-round, seasonal, concessioner, and contractor); provision of community recreation facilities, both indoor and outdoor;

provision of small private outdoor spaces; separation of employee housing areas from major roads, maintenance areas and visitor use areas; and minimizing disturbance of natural areas. When designing employee quarters, employees consistently requested larger homes with more bedrooms in order to accommodate families which tend to be larger than the "bachelor" family of previous eras; more storage; adequate winterization of buildings; interior and exterior design styles which are visually compatible with the natural environment; and garages for vehicle protection in this harsh environment. Other issues include the provision of child care, especially in West Entrance and Mammoth Hot Springs; assignment of housing units on the basis of need rather than position; adjustment of rent discrepancies between interior and frontcountry housing; and the provision of radio and television services where feasible. Jobes recommended that all housing design be flexible enough to respond to changing trends in the employee population, including shifts toward dual career couples, older employees, single parent families, and increased potential for families with children, particularly in the remote locations.

A site inventory and analysis was conducted at each housing area to evaluate both existing sites and proposed sites. The site analysis examined the potential impacts of development upon vegetation, wildlife, cultural resources, floodplains and wetlands; relationship of the site to surrounding uses; slope suitability; access; visibility; traffic conflicts; removal or relocation of existing structures; and road and utility infrastructure availability. Because of this extensive analysis, it was generally possible to avoid sensitive wildlife habitat, wetland, and other natural resource areas in the development of the proposed action for each area.

Schematic site plans were prepared, based on planning guidelines and physical and behavioral program data, to illustrate possible locations for new housing units. As planning proceeded, more specific sites for development were identified in each area. During each critical stage of the planning process, community meetings were held to present community members with proposed alternatives for housing development. The combined input from community members, concessioners, and National Park Service staff was utilized to refine the alternatives and establish a proposed alternative for each of the nine areas.

Phasing of Proposals

The development alternatives are based upon the projected staffing and associated housing needs into the early part of the next century. These improvements would occur over the next 10 to 15 years, if funding becomes available. It will be necessary for construction to proceed in phases because of funding limitations, the short length of the Yellowstone construction season, and the desire to minimally disrupt affected employees and the visiting public.

LEGISLATIVE AUTHORITY

The process of addressing employee housing concerns began in June 1987 with the appointment of a Housing Oversight Committee composed of various National Park Service representatives from around the country. The committee submitted a comprehensive report entitled the *Employee Housing Initiative* in February 1988. In this report, existing conditions of housing units were evaluated; recommendations were made on the types of housing units needed; and a Housing Initiative Program, requiring $270 million in housing improvements, was proposed.

In March 1988 a Housing Unit Design Assistance Team (HUDAT) was appointed for each region of the NPS as well as for some of the larger parks. These teams were to assist in the development of appropriate housing units for their respective region and/or park.

In July 1988 the Housing Design and Rehabilitation Guideline (NPS-76) was approved. This guideline establishes parameters for housing units so that they will be fully functional yet compatible with park settings.

Acting on the recommendations presented in the *Employee Housing Initiative,* Congress authorized the expenditure of $10 million in 1989 for initial planning and design efforts to remedy the identified housing deficiencies. Preliminary planning for housing needs in Yellowstone National Park was included in this initial appropriation. An additional $8 million for the housing initiative was approved in 1990; a portion of these funds was used to continue planning for housing improvements in Yellowstone National Park. The product of this initial planning effort is a community plan for each of the nine Yellowstone communities discussed in this assessment.

HOUSING NEEDS SURVEY
YELLOWSTONE NATIONAL PARK
JUNE 21, 1990

	CURRENT STAFF WORKING IN AREA		CURRENT STAFF LIVING IN AREA		PROJECTED STAFF TO BE HOUSED IN AREA	
	Year-round	Seasonal	Year-round	Seasonal	Year-round	Seasonal
Canyon Village	10	35	8	34	14	47
East Entrance	2	5	2	5	2	9
Grant Village	12	42	12	37	14	52
Madison Junction	5	20	5	14	9	21
Norris Junction	3	9	0	9	4	15
Northeast Entrance	3	5	1	4	3	7
Tower Junction	3	16	1	14	4	25
South Entrance	5	12	3	12	5	12
West Entrance	7	8	7	6	17	9
TOTALS	50	152	39	135	72	197

YELLOWSTONE NATIONAL PARK DESCRIPTION

NATURAL RESOURCES

Topography and Geology

Yellowstone National Park contains 2,221,772 acres (3,472 square miles) and occupies a large mountainous plateau in the northern Rocky Mountains. Elevations range from 5,200 feet to over 11,000 feet. The park is characterized by several broad, forested, volcanic plateaus surrounded by the Absaroka Mountain Range on the east, the Gallatin Mountain Range on the north, and the Red Mountains on the south.

Yellowstone encompasses a 3,500-square mile watershed that provides the surrounding area with high-quality water. The water resources within Yellowstone cover 112,000 acres and include over 600 streams (totaling some 3,700 miles) and 150 lakes (totaling approximately 108,000 surface acres). Lakes such as Yellowstone, Shoshone, Lewis, and Heart are prominent features in the park as are the Yellowstone, Snake, Lewis, Madison, Gibbon, Firehole, Gardner, and Lamar rivers.

Yellowstone contains the world's largest and most active geothermal areas. These areas were among the principal reasons for the park's establishment. Approximately 120 thermal areas in 9 major basins have been identified. These areas include geysers, hot springs, mud pots, and fumaroles.

Yellowstone is a geologically active area in the Intermountain Seismic Belt, subject to uplift and volcanism. Frequent small tremors and earthquake swarms (the dozens of quakes strong enough to be felt or to do minor damage) have their epicenters in Yellowstone every year. The park lies within a zone where major destructive earthquakes may occur.

Yellowstone National Park is part of the Intermountain Seismographic Recording Network. The ability to precisely locate earthquakes in the region varies considerably. The Yellowstone seismograph sub-network instruments are 1960s and 1970s vintage and are not adequate for recording earthquakes above a magnitude 4.0 on the Richter scale. The system is in need of upgrading and can not be used for engineering design. No studies have been completed in the park on earthquake hazard assessments related to structural design of buildings. However, the 1959 Hebgen Lake, Montana, earthquake (magnitude 7.5 on the Richter scale) is known as the "maximum credible event" for engineering design purposes in the Intermountain Region.

Soils

The soils of Yellowstone are relatively young and were formed from loess, drift, alluvium, or insolifluction deposits that are mostly from the late Pleistocene or Holocene epochs. They are moderately acidic and have a moderate to high saturation level and low water-holding capacity. Site-specific soil information is lacking for the project areas, but a recent soil study characterizes major soil types in Yellowstone (Trettin 1986). These characterizations are addressed under each area's proposal.

Radon is a gaseous element occurring when radium naturally disintegrates. It is found in a variety of soil types and has been known to have carcinogenic effects on humans. The Environmental Protection Agency has determined that a radon gas level in homes of 4 picocuries/liter or greater requires some type of mitigation. Radon levels between 50-100 picocuries/liter require immediate mitigation; levels above 100 picocuries/liter in an area preclude development.

Climate

Yellowstone's climate can be divided into four distinct seasons. Winter is characterized by daily maximum temperatures dropping below freezing and snow accumulations beginning in late October. These weather conditions last into late March or early April. Spring is characterized by melting snow, cool to cold nights, and cool to warm days beginning in early April and lasting into June. Summer lasts through August and is characterized by warm days, frequent thunderstorms, and infrequent freezing nighttime temperatures. In September, freezing nighttime temperatures and warm to cool days signal the beginning of a brief fall.

There are two major climatic types in Yellowstone, valley and mountain. The valley type is common to large valleys and central plateaus and is similar to that of the Great Plains, with peak precipitation falling as rain in May and June. The mountain type occurs along the Continental Divide and at higher elevations throughout the park. The mountain climate is characterized by precipitation falling primarily during the winter months. These two climatic types are reflected in the vegetation.

Vegetation

The Yellowstone and Lamar river valleys are covered by dry grasslands and sagebrush steppe communities with Douglas-fir found on the north-facing slopes. These predominantly treeless areas make up nearly 20 percent of the park.

Yellowstone's mountains and high plateaus are generally covered by coniferous forests or moist meadows. Following the retreat of the last glacial period, about

11,000 years ago, tundra gave way to a cold-climate coniferous forest. Whitebark pine and subalpine fir forests were eventually invaded by lodgepole pine, which today occupies approximately 80 percent of the present forested area of Yellowstone. Most of Yellowstone's present forests became established between 1450-1860.

Vegetation classifications for Yellowstone have been developed in a detailed habitat and cover type study (Despain 1990). Seventeen cover types and 30 forested and 12 nonforested habitat types were defined. Habitat types are based on the physical conditions of the site (soil, water, topography, light, etc.) and the expected climax community. Cover types (overstory vegetation) are determined by main stand structure, whether forested or nonforested. In this document, the classification standards of forest overstory follow that of Despain (1990). The classification standards of habitat type follows that of Steele et al. (1983) and Pfister et al. (1977). Common plant names as identified in the document follow that of Despain (1975).

The park's recently completed parkwide vegetation classification system identifies general wetland types. The primary wetland type, wet meadow/sedge marsh, has been identified in each area. Principal species found in this type include tufted hairgrass, pinegrass, and bluejoint reedgrass. Wetlands containing predominantly wet meadows are seasonally saturated and are dominated by tufted hairgrass, while sedge marsh areas tend to be saturated at all times. Both of these wetlands are generally found on poorly drained soils, in drainages where silt and organic matter accumulate. They are considered poor habitat for water birds due to lack of standing water.

At least 131 non-native plant species are known to occur in Yellowstone. Most exotic species in the park are found in disturbed areas such as developments, road corridors, and thermal basins. The potential for proliferation of exotic plant species must be considered before undertaking any ground disturbance. In the future, detection and control efforts will be required to minimize the widespread displacement of native plant communities.

Development in forest ecosystems such as Yellowstone necessitates management of hazardous trees in order to provide a reasonable degree of safety for park residents. The toppling of trees, or "tree failures," results from insect infestations, disease, windfall, old age under natural conditions, and from mechanical damage, soil compaction, and adjacent tree removal in conjunction with construction activities. Property damage from tree failures is a recurring problem.

Fire behavior in Yellowstone is dependent upon understory vegetative fuels and weather conditions. Yellowstone National Park's Wildland Fire Management Plan (1991) divides the park into three management zones: suppression, conditional, and prescribed natural fire. In each zone, various fire management strategies, including management-ignited prescribed fires, are utilized to accomplish management objectives under prescribed conditions. For the portions of the park where dense tree understory and heavy accumulations of downed fuels exist near developed areas, hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels) may be necessary to reduce the threat of unwanted fire.

Wildlife

Yellowstone is home to numerous wildlife species, including black bear, elk, bison, moose, pronghorn antelope, mule deer, bighorn sheep, coyote, mountain lion, badger, porcupine, snowshoe hare, river otter, marten, long-tailed weasel, red squirrel, beaver, northern pocket gopher, Uinta ground squirrel, golden eagle, osprey, trumpeter swan, harlequin duck, American white pelican, Caspian tern, common loon, sandhill crane, great gray owl, Steller's jay, red crossbill, sagebrush lizard, and rubber boa.

Local wildlife can become habituated to the presence of humans and are often seen in the developed areas. They can also become tolerant of human presence and activity close to their dens and bedding sites. However, such intrusions can result in aggressive animal behavior when humans approach too closely.

Water Quality

Water quality in Yellowstone is considered nearly pristine. Streams and lakes are designated as Class I by the state of Wyoming. This designation is used primarily to evaluate water quality related to wastewater discharge into aquatic ecosystems.

Fisheries

Fish native to Yellowstone include Arctic grayling; westslope and Yellowstone cutthroat; mountain whitefish; Utah, longnose, mountain, and June suckers; various minnows; and mottled sculpin. Their ranges and densities have been altered during the past through exploitation, introduction of exotic species, and natural factors. Non-native species found in Yellowstone today include the lake chub, as well as rainbow, brown, brook, and lake trout.

The objectives of the Yellowstone fisheries program are to manage aquatic resources as an important part of the park ecosystem; to preserve and restore native fishes and their habitat; and to provide recreational fishing opportunities for the enjoyment of the park visitor, consistent with the first two objectives.

Air Quality

Under the Clean Air Act, as amended, Yellowstone is a mandatory Class I area, where air quality degradation is not acceptable. This classification requires direct affirmative responsibility for the protection of air quality related values, including visibility. No significant permanent air pollution sources occur near the park. However, wildland and prescribed natural fires have the potential to cause poor visibility and generate airborne particulates. Human-related sources of pollution in the park include motor vehicles, campfires, wood stoves, oil and propane heaters, and boilers for generating hot water and steam. In addition, the National Park Service operates an asphalt batch plant at Norris Junction during the summer season. A smoke plume is visible from the area, and generated odors are locally evident during periods of operation. No emissions testing has been conducted on the equipment. It is unknown what emissions are generated and in what quantities. Pending testing, it is not known what emissions controls might be necessary. The National Park Service is in the process of applying for a permit from the state of Wyoming for continued operation. Other sites in the park may have temporary asphalt batch plants which are operated during the summer season by contractors.

Baseline air quality monitoring over the past decade shows that ambient air quality and visibility in Yellowstone are generally of very high quality. In 1980, the park was added to the National Atmospheric Deposition Program (NADP) for measuring wet and dry acid deposition. The NADP station is located at the Tower Ranger Station. Special congressional appropriations in 1986 and 1987 authorized the addition of new Class I visibility monitoring network sites and pollution monitoring programs; Yellowstone was one of those sites. The Lake Ranger Station has an air quality station that includes visibility monitoring and is a link in the Interagency Monitoring of Protected Visual Environments (IMPROVE) network studying particulates, ozone, and other pollutants. In 1988, a transmissometer was located in the Mammoth area as part of the visibility monitoring program. Any wildland fires or prescribed fires are monitored with portable equipment for potential safety hazards related to smoke.

THREATENED AND ENDANGERED SPECIES

Several wildlife species are listed as protected under provisions of the federal Endangered Species Act of 1973 (as amended) and are present in Yellowstone National Park and the greater Yellowstone ecosystem (GYE). These species include the endangered peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and whooping crane (*Grus americana*), and the threatened grizzly bear (*Ursus arctos horribilis*). Comprehensive programs offer strategies to preserve healthy populations and minimize adverse interactions with human activities for each of these species. There are no federally listed threatened or endangered plant species in Yellowstone.

A fifth wildlife species, the Rocky Mountain gray wolf (*Canis lupus*) was eliminated from Yellowstone by government action between 1914 and 1926. The gray wolf was listed as an endangered species in 1978 in the lower 48 states, except in Minnesota. The gray wolf is the only major component of the park's ecosystem that is missing. In 1988, the U.S. Congress directed the National Park Service and the U.S. Fish and Wildlife Service to study the potential for wolf recovery in Yellowstone. Preparation of a management plan following the National Environmental Policy Act (NEPA) compliance process and involving public review of the alternatives will be done prior to any restoration of wolves to Yellowstone.

CULTURAL RESOURCES

For at least 10,000 years, Native Americans occupied the greater Yellowstone area. The majority of the use is assumed to have occurred seasonally. Historically, the Crow, Shoshone, Bannock, Blackfeet, Nez Perce, and Gros Ventre were known to have visited the park (Cultural Sites Inventory for Yellowstone National Park, Midwest Archeological Center 1990). Archeological and historic evidence indicates that one group of Shoshone known as the Sheepeaters occupied portions of Yellowstone year-round during the first half of the nineteenth century. Further archeological research may show that other prehistoric and historic Native American groups occupied the park year round as well. A number of archeological sites provide evidence of the Native American presence in Yellowstone National Park. These sites include hearths, game drives, base camps, chipping stations, rock shelters, wickiups, and stone circles, among others.

Less than 2 percent of Yellowstone's 2.2 million acres have received any kind of archeological survey. As a result of the surveys which have been completed, approximately 550 prehistoric and historic archeological sites have been recorded. Included within the historic archeological sites are those of Euro-American origin. The majority of the archeological sites have not been evaluated for eligibility to the National Register of Historic Places. One of the few sites that has been evaluated for eligibility to the National Register is Obsidian Cliff, a prehistoric quarry site. It was determined to be so significant that the process of nomination as a National Historic Landmark has been initiated.

The ethnographic record for Yellowstone National Park is incomplete. The cultural resources component of the Resources Management Plan will identify the need to develop an ethnographic overview and assessment. (A Resources Management Plan documents a park's natural and cultural resources, describes and evaluates its current resources, identifies resource problems and data deficiencies, and prescribes an action program.) What little is known indicates that some "Native American myths and ethnohistoric reconstructions regard Yellowstone Lake and the immediate vicinity as ethnic homelands" (Reeve, 1989). The Kiowans, Apacheans, and Shoshoneans are three of the Native American groups thought to have a mythological/ethnohistorical connection with Yellowstone. The historic record also gives evidence of the Native American presence in Yellowstone, as mentioned above.

Yellowstone National Park was established in 1872, becoming the world's first national park. The administration of the park was initially civilian (1872-1886), then military (1886-1916), and then National Park Service (1916-present). Today, a number of historic sites and structures represent the three types of administration. The majority of the historic structures are associated with the military and National Park Service administrations and the development of concessions within the park. Many of the buildings, bridges, and other structures built by the military, National Park Service, and park concessioners represent a rustic style of architecture. Stonework, massive timbers, and decorative woodwork were used in a way to make buildings compatible with the natural setting.

Yellowstone has 952 historic structures on the List of Classified Structures (LCS); of these, 553 are determined to be eligible to or are listed on the National Register of Historic Places. The remaining 399 structures still need to be evaluated for eligibility to the National Register. Five historic structures have been designated as National Historic Landmarks. These include the museums at Madison, Norris, and Fishing Bridge; the Northeast Entrance Station; and the Old Faithful Inn. The majority of Yellowstone's historic structures are located within six historic districts and other developed areas. Some of the structures, though, are located outside of the historic districts and developed areas. Examples of these structures include backcountry cabins, fire towers, and interpretation kiosks. Most of the buildings that are eligible or are listed on the National Register have been evaluated for exterior significance only.

A cultural landscape is a geographic area, including both cultural and natural resources, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Cultural landscapes in Yellowstone National Park have not been identified. The cultural component of the Resources Management Plan will mention the need to identify potential cultural landscapes and evaluate their eligibility to the National Register of Historic Places.

SOCIAL AND ECONOMIC RESOURCES

Yellowstone National Park is located in the northwest corner of Wyoming, with portions extending into southwestern Montana and southeastern Idaho. The park lies within Wyoming's Teton and Park counties, Montana's Park and Gallatin counties, and Idaho's Fremont County. The gateway communities of West Yellowstone, Gardiner, Cooke City, and Silver Gate, Montana, are immediately adjacent to the park. The communities of Cody and Jackson, Wyoming, are within an hour's drive of the park.

Land surrounding the park is primarily under the jurisdiction of the U.S. Forest Service. These forests include the Gallatin, Targhee, Bridger-Teton, Shoshone, Custer, and Beaverhead. A few small parcels of land owned by the state of Montana also border the park, as do some privately-owned properties, of which the Royal Teton Ranch is the largest private landowner. This ranch is located along the northern boundary of the park, west of Gardiner, Montana.

The park is a prominent feature in the social and economic life of the three-state area. Annual visitation to Yellowstone National Park over the past 10 years has averaged 2.45 million visits. Two-thirds of the park's annual visitation occurs during the peak summer season (mid-June through the end of August). Daily visitation during this season averages around 20,500 people, with visitation on peak days exceeding 23,000 visitors. Many travelers combine their visit to Yellowstone with a trip to Grand Teton National Park, which is just south of Yellowstone and is connected to Yellowstone by the John D. Rockefeller, Jr., Memorial Parkway.

Visitor use in the spring accounts for 23.2 percent of the annual visitation, while only 7.3 percent occurs during the fall and winter. Use of Yellowstone during spring and fall (the shoulder seasons) has been increasing as recreationists are learning they can enjoy the park without having to endure the traffic congestion prevalent during summer. Winter use has also been increasing, with over 90,000 visitors in recent years.

Surveys of Yellowstone's visitors were conducted in 1987 and 1989 (Machlis and Dolsen 1988; Littlejohn, et al. 1990). They document generally consistent visitor use patterns and perceptions before and after the fires of 1988. Recreational activities such as viewing wildlife and thermal features, photography, walking, and visiting museums were the primary activities reported in both visitor surveys. Since the fires of 1988, viewing of the changes caused by the wildfires has become a popular visitor activity. Other activities reported include fishing, camping, hiking, horseback riding, and boating. Winter activities include snowmobiling, cross-country skiing, and snowshoeing.

The survey showed that Yellowstone visitors come from all fifty states. Nearly half of all visitors are from the West Coast or Rocky Mountain states. California alone accounts for about 11 percent of total U.S. visitation. International visitation represented approximately 7 percent of total park visitation. The recent studies revealed that over half of the recreationists in the park are repeat visitors.

The developed areas provide a range of visitor services and activities, generally from the last week of May through mid-September. Most services and recreational activities are limited to spring, summer, and fall because the interior roads of the park are not plowed during the winter. However, all the areas are accessible by snowmobile during the winter, and some snow-based recreational activity does occur (these activities have been addressed in the 1990 *Winter Use Plan*). The opening and closing dates for lodging facilities, campgrounds, and other visitor services can fluctuate from year-to-year due to varying weather conditions.

The popularity of recreation and tourism in the area make the communities in the greater Yellowstone area heavily dependent upon federally-managed lands. These communities and their businesses receive significant income by providing goods and services to park visitors. Local businesses also benefit from annual NPS and concessioner expenditures for salaries, goods, and services. Short-term benefits result from periodic capital-improvement projects such as those described herein. The construction projects resulting from the proposals would provide a short-term economic benefit to the local communities and regional contractors.

VISITOR USE

NATIONAL PARK SERVICE OPERATIONS

Campgrounds and Campsites

Yellowstone National Park operates ten frontcountry campground sites during the summer, in addition to the Mammoth campground which is operated year-round. The Fishing Bridge Recreational Vehicle Campground is concessioner-operated and has water, sewer, and electric hook-ups.

Approximately 288 backcountry campsites are maintained throughout the park.

Roads

Yellowstone contains approximately 539 equivalent-miles (22 feet wide, 1 mile long) of road, including 43 miles of the Beartooth Highway that are maintained as a part of the Park Approach Act of 1931. Of this total, 410 miles are paved roadways, 73 miles are gravel or dirt roads, and 56 miles are equivalent-miles of parking areas and pullouts throughout the park. Approximately 370 road miles, plus parking areas and pullouts, are available for public use. The remaining miles are used for administrative purposes and housing areas. Approximately 200 miles of road are groomed for over-snow use during the winter. There are 60 bridges within the park.

Trails

Yellowstone has approximately 1,151 miles of backcountry trails, 60 miles of frontcountry trails, and 6 miles of boardwalks around thermal features.

Buildings

Yellowstone has more than 2,200 permanent buildings with over 3.5 million square feet of floor space. In addition to permanent buildings, there are 180 portable structures (mobile homes and movable dormitories) with 45,054 square feet of floor space. Of these buildings, approximately 688 are operated and maintained by TW Recreational Services, Inc.; 38 by Hamilton Stores, Inc.; and 16 by Yellowstone Park Service Stations. The National Park Service maintains 420 housing units, accommodating National Park Service employees in 16 different developed areas. Two hundred and forty of these units are houses and apartments, and 180 are temporary structures such as recreational vehicles, used seasonally.

Approximately 1,130 buildings are more than 50 years old and are thus treated as potentially historic structures. These buildings are used for employee quarters, visitor facilities, and administrative purposes.

Many of the park's buildings are in a semi-deteriorated condition. Some improvements have been made since 1980, such as improving wiring to meet established code, renovating kitchens, and making other fire safety and code improvements. However, structural deficiencies remain. Although a few historic structures have been rehabilitated, many of the historic structures require interior and exterior repairs in order to stabilize them. A substantial cyclic maintenance program is needed to prevent further deterioration.

Utility Systems

Yellowstone operates 26 water and 25 wastewater treatment systems. Water is obtained from either subsurface sources via well or spring water systems or from surface waters. These surface waters are treated in four chemical coagulation/filtration plants. Total water system capacity is approximately 4.3 million gallons per day. Each year, 270 million gallons of water are treated.

Wastewater treatment systems consist of septic tanks, trickling filters, aerated lagoons, and activated sludge systems. Five systems have capacities exceeding 200,000 gallons per day. The parkwide capacity is approximately 3.9 million gallons per day.

All solid waste generated in the park is collected and taken to West Yellowstone or Livingston, Montana for disposal. Approximately 2,500 tons of solid waste are generated each year and disposed of in this manner. The National Park Service, in conjunction with the concessioners, began a recycling program in 1990. Approximately 200 tons of aluminum, glass, paper, and cardboard were recycled the first year.

Montana Power Company provides electricity to most of the park, including standby generators at four locations. Three other utility companies provide power to four of the entrance stations. The park itself generates power at four locations and provides emergency standby power to smaller areas and to sewage lift stations at many park locations.

CONCESSIONS OPERATIONS

There are three concession contracts in Yellowstone, one concession permit, a joint venture agreement and approximately 70 horse outfitters authorized under limited concession permits. Approximately 742 buildings are assigned to concessioners. During the peak season, concessioners employ approximately 3,400 employees, the majority of whom are housed in the park.

The superintendent has determined that the range and level of concession services available in the park are appropriate and necessary to ensure visitor safety and protection of natural resources.

Concessioners

TW Recreational Services, Inc. TW Recreational Services (TWRS) operates 2,170 overnight lodging units, 18 food service outlets, 10 gift shops, 1 marina, 3 horse operations, transportation services, 2 camper services operations with public showers and laundries, and a recreational vehicle park with 358 sites. TWRS employs approximately 2,400 people during peak season.

Overnight accommodations in the winter are available at Mammoth Hot Springs and Old Faithful Snowlodge.

Hamilton Stores, Inc. Hamilton Stores operates 15 general stores, with limited food service in 8 of the outlets, and provides souvenir sales. They employ approximately 885 people during the peak summer season.

Yellowstone Park Service Stations. Yellowstone Park Service Stations (YPSS) operates under a joint venture agreement between Hamilton Stores and TW Recreational Services and the National Park Service. The concession facilities are owned equally by the National Park Service and Hamilton Stores. YPSS provides gasoline and wrecker and repair services. YPSS operates 8 service stations and has wrecker and repair service at 4 locations. They employ approximately 97 people during the peak summer season.

West Park Hospital. West Park Hospital provides the park's medical services, including an emergency stabilization unit at Lake (14 beds), ambulance service, sale of prescription drugs, and two clinics. The clinic at Old Faithful is operated seasonally while the Mammoth Hot Springs clinic is operated year-round. West Park Hospital employs approximately 45 people in Yellowstone during the summer.

Firebox, Inc. Firebox, Inc., provides vending machines that dispense firewood. These vending machines are currently located at six campgrounds within Yellowstone. Firebox, Inc., employs one full-time person and several part-time workers during the summer season.

CANYON VILLAGE

PURPOSE AND NEED

The Grand Canyon of the Yellowstone has been one of the most popular attractions in Yellowstone since the Euro-American discovery of this region. Each expedition following the Yellowstone River passed the canyon. After Superintendent Philetus Norris established bridle trails through Yellowstone in the 1870s, the Canyon became the second most popular destination in the park, with the geyser basins being the first. When the army was pursuing the Nez Perce Indians in 1877, General Howard's troops quickly built a wagon road around Mount Washburn. After that, the route from Canyon to Mammoth, around Mount Washburn, became very popular. Army troops were formally assigned to the park in 1886 and established a soldier station at Canyon on the west side of the river above the falls. Poaching activity during the winter of 1887 demonstrated the need for the soldier station to be continuously occupied.

In 1886, permission was granted to erect a temporary building at Canyon to be used as a hotel. It was understood that the building would be removed at the end of the season, but it was used until 1891 when a new and more comfortable facility was built. The second hotel remained in operation until the construction of the immense Canyon Hotel in 1910-1911. Permanent tent camps were erected at Canyon by both the Wylie Company and the Shaw and Powell Company. The Shaw and Powell camp on the Artist Point road was used until the construction of lodge facilities in the same area.

In the 1930s, a Civilian Conservation Corps (CCC) camp was located near the site of the present-day Canyon Village. Other than the removal of the CCC camp, little change took place in the Canyon area until the Mission 66 program was initiated. The Mission 66 program ultimately resulted in the removal of the lodge and hotel facilities and the construction of the existing Canyon Village, resulting in a consolidation of facilities and services. This development was conveniently located at a major junction of park roads at a location less intrusive on the natural setting of the Grand Canyon of the Yellowstone.

Today the National Park Service conducts maintenance operations, visitor services, interpretation, resource and visitor protection, and emergency services for the eastern half of the Canyon Subdistrict from this area. In addition, the NPS, concessioners, and utility contractors provide housing for their employees in this area.

Employees who live within the Canyon Village area are affiliated with the NPS interpretive, ranger and maintenance divisions. The total number of employees working in this area averages 45; approximately 10 are year-round employees and 35 are seasonal. However, existing housing will accommodate only 8 year-round employees and 34 seasonal employees. The remaining employees must commute to Canyon Village from other park locations.

A total of 61 government employees would be duty-stationed at Canyon Village when NPS staffing projections are reached. Housing would be provided for all employees in this area, with 14 housed year round and 47 housed seasonally. In accordance with park policy, the existing four mobile homes would be removed and replaced with permanent structures. For the foreseeable future, existing year-round and seasonal residences can be used, given modest renovation and maintenance. However, the seasonal residences should be slated for long-term redevelopment, since these Mission 66 facilities do not meet NPS standards. Because of their age, three buildings in the Student Conservation Association (SCA) complex may be considered historic; none of these would be altered as part of this project. No existing residential quarters meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities. A softball field exists north of the NPS housing area; this would be retained for employee use.

Existing NPS maintenance facilities are not adequately winterized to serve current and projected needs.

Although the housing area is located in a lodgepole pine forest, some portions of the developed area are visible from the Grand Loop Road. Any new construction would be carefully sited to minimize its visibility. Several parcels within the area considered for development have been designated as wetlands; they would not be disturbed by the proposal.

An average of 530 people are employed in the Canyon Village area by three different concessioners. Approximately 64 of these employees are housed in the seasonal RV park north of the NPS housing area. The remaining 466 employees are housed in dormitories and cabins in other areas of Canyon Village east and south of the NPS housing area. Staffing projections indicate that a total of 674 concessioner employees would require housing in the Canyon Village area. This increase in concessioner employee numbers must be accommodated in areas other than the NPS housing area, because insufficient room exists to support this expansion.

A varying number of utility contractors also require recreational vehicle (RV) spaces on an irregular basis. The existing area used for this purpose, north of the concessioner RV spaces, would be retained in its present configuration for these contractors.

The Canyon Village concessioner facilities are not operational during the winter. However, the main roads are maintained for snow vehicle use and several visitor support services are provided in this area, including a warming hut, snack bar, gas station, and restrooms. Current facilities are inadequate for the increasing winter use the area receives. In order to serve the needs of visitors and protect the resources of the park at this time of the year, interpretive, ranger and maintenance services will need to be provided from winterized facilities at Canyon Village.

ALTERNATIVES

In the development of the community planning proposal for the Canyon Village area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and are therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the Canyon Village area were evaluated for their suitability to support employee housing. Of these areas, areas "B" and "C" were considered unsuitable for development due to the extensive existing forest and the proximity to maintenance operations. Areas "D" and "E" were considered for NPS housing, but it was determined that no other areas existed to support the necessary existing concessioner and contractor RV usage, so these areas were retained for their present use. Area "F" was considered unsuitable for development because it was determined that the existing recreational facility would be retained. Area "A" was considered most suitable for development, provided that existing wetland areas were avoided during construction. In addition to these general parameters, other site specific concerns were considered in developing the range of acceptable alternatives; alternatives were not pursued if they would be visible from the Grand Loop Road or if they poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Canyon Village area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Several NPS and concessioner employees who are housed in the area would continue to live in substandard mobile homes. Handicapped accessible housing would be unavailable. No community center or indoor recreation facilities would exist.

The Proposal

This plan addresses the community needs identified for the Canyon Village area through development of several new areas. Additional housing for NPS employees would be added, as would community facilities. Much of the new construction would occur in undisturbed forested areas, but within the periphery of the existing housing area.

Housing

Projected needs for park employee housing would be met with this plan. Twelve new two-story, year-round quarters would be added around a small loop road north of the existing wetlands. In addition, the 2 existing year-round quarters would be retained for a total of 14 year-round quarters. Phasing of the construction would be possible because the area for new development would not overlap existing housing. New construction would meet NPS housing design standards.

Twenty-two seasonal quarters would be provided in newly constructed units located just north of three of the existing seasonal residential structures. In addition, 25 quarters in four existing buildings would be retained and renovated for the present, with redevelopment slated in the future. Phasing of the construction would be possible because the area for new development would not overlap with existing seasonal housing. New construction would meet NPS housing design standards.

The existing RV spaces for concessioner employees and contractors would be retained in their current configuration. These spaces would be phased out in the long-term.

With the completion of the new construction, at least 5 percent of the total number of NPS employee quarters would be handicapped accessible.

Recreational Facilities

A small community center would be built east of the existing seasonal residential structures. In addition, the existing softball field would be retained in its current location.

Alternative One

This plan partially addresses the community needs identified for the Canyon Village area through redevelopment of several areas and development of several new areas. Additional housing for NPS employees would be added as would community facilities. Some of the new construction would occur in undisturbed forested areas.

Housing

Projected needs for park employee housing would be met with this plan. Twelve new two-story, year-round quarters would be added in two clusters in the areas currently occupied by the concessioner and contractor RV spaces, which must be accommodated elsewhere in Canyon Village. In addition to these 12 new quarters, the 2 existing year-round quarters would be retained, for a total of 14 year-round quarters. Siting of the year-round units in this location would require snow plowing of lengthy road segments in the spring. The new construction would require phasing in conjunction with the removal of existing RV sites. New construction would meet NPS housing design standards.

Forty-seven seasonal quarters would be provided in a combination of existing and newly constructed units. Twenty-two employees would be housed in new quarters constructed in two clusters just north of the existing seasonal residences. In addition, 25 quarters in four existing buildings would be retained and renovated for the present; redevelopment would take place in the future. The new construction would be phased-in. New construction and rehabilitation would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total NPS employee quarters would be handicapped accessible.

Recreational Facilities

A small community center would be constructed next to the existing softball field, which would be retained.

Alternative Two

This plan partially addresses the community needs identified for the Canyon Village area through redevelopment of several areas and development of several new areas. Additional housing for NPS employees would be added, as would community facilities. Some of the new construction would occur in undisturbed forested areas.

Housing

Projected needs for park employee housing would be met with this plan. Twelve new two-story, year-round quarters would be added along a loop road north of the existing seasonal residential structures. Disturbance of wetland areas would occur during construction of these units. If this alternative were selected, appropriate wetland mitigation would be undertaken. In addition to these 12 new quarters, the 2 other existing year-round quarters would be retained, for a total of 14 year-round quarters. The new construction would require phasing in conjunction with the removal of existing RV sites. New construction would meet NPS housing design standards.

Forty-seven seasonal quarters would be provided in a combination of existing and newly constructed units. Twenty-two employees would be housed in new quarters constructed in the area currently occupied by the concessioner RV spaces. In addition, 25 quarters in four existing buildings would be retained and renovated for the present; redevelopment would take place in the future. The existing contractor RV spaces would be retained. The new construction would require phasing in conjunction with the removal of existing RV sites. New construction and rehabilitation would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total NPS employee quarters would be handicapped accessible.

Recreational Facilities

A small community center would be constructed in the middle of the area occupied by the existing seasonal structures and the new year-round quarters. The existing softball field would be retained.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the Canyon Village vicinity are formed from glacial till derived from rhyolitic lava flows. The soil texture varies from loam at the surface and sandy loam in the subsoil to generally sandy loam. Gravels make up 10-20 percent of the soil. No larger rock fragments were observed. The soil surface is 4-6 inches thick with a slightly acid to acid pH due to geothermal alteration of the parent material. Depth to bedrock is 5 feet or more. The topography is gently rolling with slopes ranging from 0 to 15 percent and averaging 5 percent. The soils are generally well drained with low fertility.

There are lenses and pockets of impervious silt throughout the Canyon area which restrict water percolation (horizonal and vertical permeability). The water table is consistently near the ground surface, and the existing surface drainage is poor. Heavy winter snowfall and short summers contribute to this high water table. Native soils are susceptible to frost heaving due to the fine particle size, high moisture content, and deep frost level. They are not suitable for fill material, but are generally suitable for site grading.

Seismic activity in this area has been monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 5.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences ranged from 1.6 to 1.63 picocuries/liter. This suggests that the radon contamination potential is low for the area.

A very small area north of the three existing seasonal residential structures has been documented as having soils contaminated from fuel oil leakage; new construction would not disturb this area. However, should the contaminated area be larger than documented, proper measures would be taken to mitigate any adverse impacts.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in accelerated deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to modify existing roads and parking areas and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 3.0 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects on soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction, in order to determine whether mitigation measures are necessary.

Alternative One

Under Alternative One, new construction of roads, parking and housing would disturb 2.2 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two
Under Alternative Two, new construction of roads, parking and housing would disturb 4.5 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

The areas considered for development in the Canyon Village area support two different vegetation types with slight variations within each vegetation type. The first major type is found in the extreme northern, eastern, and western portions of the government housing area and also in a small island in the concessioner mobile home court. It is classified as a PICO/CARO habitat type with either an LP1 or LP2 cover type. In these areas, lodgepole pine dominates the overstory, and both lodgepole pine and whitebark pine are found in the understory. The herbaceous understory consists of Ross's sedge, Wheeler's bluegrass, spike trisetum, western needlegrass, grouse whortleberry, heart-leafed arnica, northern goldenrod, silvery lupine, white-flowered phlox, and fireweed. A variation of this type is present in the area to the extreme north of the concessioner/contractor's trailer court. It is mapped as a PICO/VASC habitat type with an LP2 cover type. This type is similar in plant species composition except that more grouse whortleberry and less Ross's sedge are present, reflecting the slightly more mesic conditions.

The second main vegetation type within the area is an ABLA/CACA habitat type with either an LP1 or LP2 cover type. In the government housing area, the ABLA/CACA type (LP2) is further classified as having a more xeric southern lobe and a more mesic northern lobe. Lodgepole pine dominates the overstory with subalpine fir seedlings present in the understory. The herbaceous understory is dominated by bluejoint reedgrass, tufted hairgrass, Wood's strawberry, graceful cinquefoil, thick-stemmed aster, western mountain ster, grouse whortleberry, and western huckleberry. The northern lobe of the vegetation type has all these species present, whereas the southern lobe is predominantly bluejoint reedgrass. Hydric soils and standing groundwater are present in the northern lobe, consistent with wetlands delineation criteria. The southern lobe, however, lacks soil and groundwater conditions indicative of wetlands.

The other ABLA/CACA type (LP1), in the immediate area of the government maintenance facility, represents a wetter condition. Lodgepole pine again dominates the overstory, and a few scattered subalpine fir seedlings are present in the understory. The herbaceous understory is dominated by the shrubs Wolf's willow, planeleaf willow, western huckleberry, and large-leaved avens; by the forbs western mountain aster, Wood's strawberry, alkali-marsh groundsel, streambank groundsel, and globeflower; and by the graminoids water sedge, beaked sedge, Wolf's trisetum, alpine timothy, and tufted hairgrass. In this type, the vegetation, soils, and groundwater hydrology are indicative of wetlands.

No sensitive, threatened, or endangered plant species were found in the area.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to modify existing roads and parking areas and channel new development into previously disturbed areas. Nevertheless, construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 3.0 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short-term, but some deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seed and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to the vegetation would be insignificant after completion of the revegetation efforts.

Alternative One
Under Alternative One, new construction of roads, parking, trails and housing would disturb 2.2 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two
Under Alternative Two, new construction of roads, parking, trails and housing would disturb 4.5 acres, including removal of a dense stand of lodgepole pine in the area of the new community center building. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

Large mammals found in the Canyon Village area include bison, moose, elk, deer, grizzly bear, and black bear. Smaller mammals include coyote, red fox, porcupine, red squirrel, pine marten, weasel, mice, and voles. Typically, there are small groups of bull bison around the Canyon Village area throughout the year, with larger numbers occurring during the early summer and fall seasons. It is extremely rare to see cow/calf bison herds around Canyon Village. There is a summer resident elk population. They usually leave the area in the fall. Moose inhabit the village area year-round. Mule deer normally inhabit the area during the spring and fall.

One of the more prominent bird species in the immediate village area is the great gray owl. Other birds using this general area of the park are bald eagles, ospreys, and peregrine falcons, as well as typical forest and meadow dwellers such as sparrows, warblers, sharp-shinned hawks, gray jays, and ravens.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species suspected in the vicinity of the project area include tiger salamander, boreal toad, striped chorus frog, and western spotted frog. Reptile species include wandering garter snake and possibly the rubber boa.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence in the area would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 3.0 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 2.2 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative Two would disturb approximately 4.5 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

Canyon Village does not lie in any 100- or 500-year floodplains or flash-flood hazard area.

A wetland inventory of this area has been completed. The sedge meadows in and adjacent to Canyon Village are small wetlands with saturated soils resulting from the high water table and moisture retaining soils. While lodgepole pine is not generally considered a wetland plant species, it does grow in the Canyon area in association with bluejoint reed grass, which is usually a wetland species. Construction would not occur in areas identified as wetlands, except as discussed under Alternative Two.

Environmental Consequences

No-Action Alternative

There would be no additional impacts to wetlands under this alternative.

The Proposal

Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative One

Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative Two

Approximately 0.2 acres of designated wetlands would be disturbed for construction of a community center building and one year-round quarters. Wetland restoration or mitigation actions would be undertaken in compliance with Section 404 regulations relating to wetland and NPS guidelines. Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

WATER QUALITY

Affected Environment

The condition of the Yellowstone River, located approximately one and one-half miles from the project area, is considered nearly pristine. The Canyon Village water supply is taken from the Yellowstone River and treated at a

700,000 gallon-per-day water treatment plant south of the area. The system has a storage capacity of 1.5 million gallons. The system was upgraded in 1983, and the capacity is sufficient for the project.

The existing Canyon Village wastewater treatment plant is scheduled for replacement. The facility is being replaced with a 400,000 gallon-per-day mechanical tertiary treatment plant that will include three new aerated sewage lagoons. Treated effluent will continue to be discharged into the Yellowstone River. The advanced wastewater treatment methods to be incorporated into this new facility will meet the demands of this project and assure acceptable quality of discharge effluent.

Environmental Consequences

No-Action Alternative

The locally high water table suggests that there is a potential for continued surface and groundwater contamination form a variety of sources. These sources include road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program to replace leaking underground tanks. New tanks are designed and constructed to control leaks, spills and contamination. Any leaking tanks would be replaced within the parameters of this program.

The Proposal

Construction activities would have a minor impact on surface and groundwater sources and wet meadow areas. Potential sources of impacts include increased sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper construction techniques, overall impacts to water quality would be minor and would not result in any long-term effects on the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any long-term effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any long-term effects on the area's water resources.

FISHERIES

Affected Environment

The Yellowstone River provides habitat for the Yellowstone cutthroat trout and longnose sucker.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no additional impacts on the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and that there would be no significant short- or long-term effects upon fish populations.

Alternative One

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Canyon Village area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves, campfires, and motor vehicles are sometimes visible in the immediate area during temperature inversions.

There is no air quality monitoring equipment in the Canyon Village area, and baseline data specific to this area is not available. The closest air quality monitoring station is south at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the north at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes during construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One are not expected to occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The one square mile Canyon Village developed area contains numerous facilities and supports a large amount of human activity. It is surrounded by forest and meadows and has terrain features that help reduce visibility and intrusiveness.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The project would not be visible from either the Norris to Canyon Road nor from the Tower to Canyon Road during daylight hours. However, nighttime light pollution from the housing area would increase.

Alternative One

Impacts on visual quality would be similar to the proposed action.

Alternative Two

Impacts on visual quality would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in and adjacent to the Canyon Village government housing area. This is a discrete area removed from the Canyon Village visitor services area.

The cultural resources that have been documented in the Canyon Village area are primarily historic. A few of the structures associated with historic activities remain, but the historic period is primarily represented by structural remnants, such as foundations and numerous dumps (Ayres 1989, Johnson 1989, Hunt 1989). The majority of these archeological sites have not been evaluated for eligibility to the National Register. No prehistoric archeological sites have been recorded in the Canyon area.

During Johnson's 1989 archeological survey, two Euro-American sites were recorded within the existing housing area: 48YE42, a water impoundment dam and 48YE43, a dynamite storage bunker. Both sites are potentially eligible to the National Register; a formal determination of eligibility, in consultation with the Wyoming State Historic Preservation Office, is still needed. The area proposed for development extending beyond the area inventoried by Johnson was investigated in 1991 (Cannon 1991). No significant archeological resources were recorded.

Fourteen potentially eligible historic structures remain in the Canyon Village area. Of these 14 historic structures, 6 are in the housing area and have the potential to be affected by the proposed project. These include: a messhouse/quarters (# 323); two bunkhouses; (# 351 and # 859); a tool shed (# 857); a power house (# 322); and a storage building (# 858). None of these structures have been evaluated for eligibility to the National Register. The other eight historic structures would not be affected directly or indirectly by the project.

Environmental Consequences

The two historic archeological sites recorded in the existing government housing area, the water impoundment dam and dynamite storage bunker, are not within the proposed project area and would probably not be affected by the proposed development. However, if the project parameters change, then sites 48YE42 (water impoundment dam) and 48YE43 (dynamite storage bunker) could be affected by the project. If this occurs, the sites should be formally evaluated for eligibility to the National Register, and if they were determined to be eligible and could not be avoided, consultation would be initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

The area of potential effects has been intensively surveyed. The surveys met the Secretary of the Interior Standards for Archeology and Historic Preservation. If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

There are six historic structures that could be affected by the proposed project. The placement of new structures must be carefully considered in relationship to the location of historic structures; if visual impacts to historic structures could not be avoided, then new construction would be designed to meet the Secretary of the Interior Standards for Rehabilitation. However, no new structures are proposed near these six historic structures. The renovation of the existing bunkhouse would not modify its external appearance.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The primary visitor attraction in this area is the Grand Canyon of the Yellowstone River. Several pedestrian and vehicle access points are located along both sides of the canyon, offering views of the Upper and Lower Falls. The area is also a departure point for many hiking trails. The meadows surrounding the Canyon area are popular locations for viewing wildlife. During summer months, the National Park Service maintains a 280-site campground, a ranger station, and a visitor center which serves as a center for interpretive activities and information and features natural history exhibits. Concessioners offer lodging, cafeteria and formal dining, gift shops, a grocery store, a service station, and horseback rides. A government post office is located at Canyon. During winter months, a warming hut and gas station are available to visitors. A concessioner operates a winter camping and ski-tour operation, and the Canyon area is a destination for snowcoach tours, snowmobilers, and cross-country skiers.

Environmental Consequences

No-Action Alternative

Under this alternative, visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected, due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. More employees would be available to serve visitors, on a year-round basis. Visitor services could be improved due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE AND CONCESSIONER OPERATIONS

Affected Environment

The National Park Service (NPS) administers their maintenance operations, visitor services, interpretive, visitor protection, resource protection, and emergency services for the eastern half of the Canyon Subdistrict from this area. The NPS operates a 280-site campground, a visitor center, ranger station, and water and sewage treatment facilities. NPS employee quarters consist of 2 single-family residences, 5 apartment buildings, and 2 bunkhouses. The quarters are located in the government housing area approximately one half mile northwest of the visitor services area of Canyon Village. During peak season, the NPS employs an average of 45 employees at Canyon Village.

Concessioner facilities in the Canyon Village area are provided by Hamilton Stores, Inc. (HSI), TW Recreational Services, Inc. (TWRS), Yellowstone Park Service Stations (YPSS), and Firebox, Inc.

HAMILTON STORES, INC.

Hamilton Stores operates one large general store (open from late May until mid- September) and a photo shop/mini store (open from early May until mid-October). These facilities are located within the visitor services area of Canyon Village, removed from the housing areas.

During peak season, HSI employs an average of 137 persons. Employees are housed in 2 dormitories and in 21 mobile home sites (2 employees per mobile home). The mobile home sites are located in the village north of the NPS housing area.

Traditionally, the majority of HSI employees have been over 50 years of age. These employees prefer private housing arrangements, either in trailers, adult dormitories, or apartments.

Hamilton Stores, Inc., has projected a need for 10 additional mobile home sites over the next ten years.

TW RECREATIONAL SERVICES

In the Canyon Village area, TWRS operates a full service lodging facility with dining room, gift shop, cafeteria, snack shop, and a corral operation (open from mid-June until late August). These facilities are located in the visitor services area of Canyon Village, except for the corral operation which is located approximately one mile south of the village and adjacent to the Grand Loop Road.

During peak season, TWRS employs an average of 375 people at Canyon Village. Current TWRS employee housing consists of 173 dormitory rooms, 1 cabin, and 14 mobile home sites (all with two employees per room). The dormitories are located adjacent to the lodging facilities. The mobile home sites are located in the mobile home village north of the NPS housing area.

TWRS employment opportunities are labor intensive seasonal jobs: maid service, groundskeeping, table service, and kitchen help. This type of work generally appeals to a younger segment of the work force, those who are students, or those who are at the beginning of their careers. These employees are usually satisfied with dormitory living.

TWRS has traditionally experienced a high rate of employee turnover. This dynamic work force requires TWRS to constantly hire new employees, sometimes resulting in temporary over-staffing.

Currently TWRS requires their managers to work a six-day week. It is the intent of TWRS to cut the management work week to five days. This will require staffing levels to increase. Because of this increase, combined with the need to house occasional numbers of excess employees, TWRS projects a need for 40 new apartments and 21 additional mobile home sites in the Canyon Village area.

YELLOWSTONE PARK SERVICE STATIONS

Yellowstone Park Service Stations operates a service station and a wrecker and repair service at Canyon Village (open from early May until early September). This facility is located immediately north of the visitor services area of Canyon Village.

During peak season, YPSS employs an average of 19 persons. Current housing for Canyon Village employees consists of 2 mobile home sites and 9 dormitory rooms.

The majority of YPSS seasonal positions are labor intensive, typically held by younger employees. In general, these employees are usually satisfied with dormitory living.

Existing housing at Canyon Village for YPSS employees is sufficient for the current and foreseeable future.

FIREBOX, INC.

Firebox operates one wood vending machine at the Canyon Village Campground. No Firebox employees reside in the Canyon Village area.

Environmental Consequences

No-Action Alternative

The No-Action Alternative would have no immediate adverse impacts on the NPS or concessioner operations in the Canyon Village area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could possibly create an adverse impact on the NPS and/or concessioners' hiring ability which could effect their operations.

The Proposal

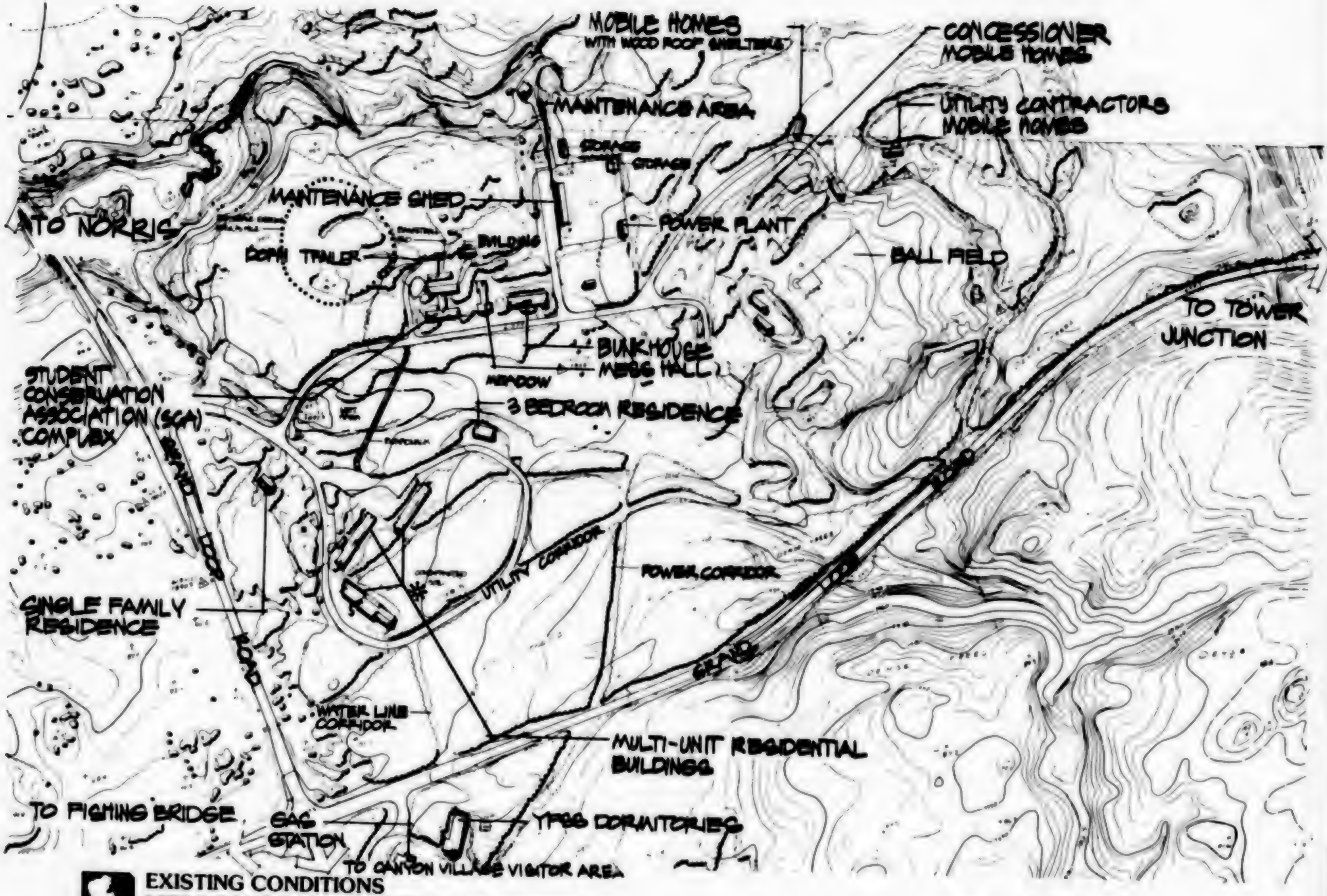
The Proposal would meet the NPS and concessioners' program requirements for housing. Construction of new housing units would improve employee morale by providing better housing with increased privacy and additional living and storage space, and by alleviating overcrowding. Recreational and community facilities would be improved. The proposed action would house employees of similar lifestyles in the same area and, therefore, should enhance employee satisfaction. The construction projects resulting from the Proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity and associated noise and dust could have an adverse effect on residents near the area of construction. This would be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

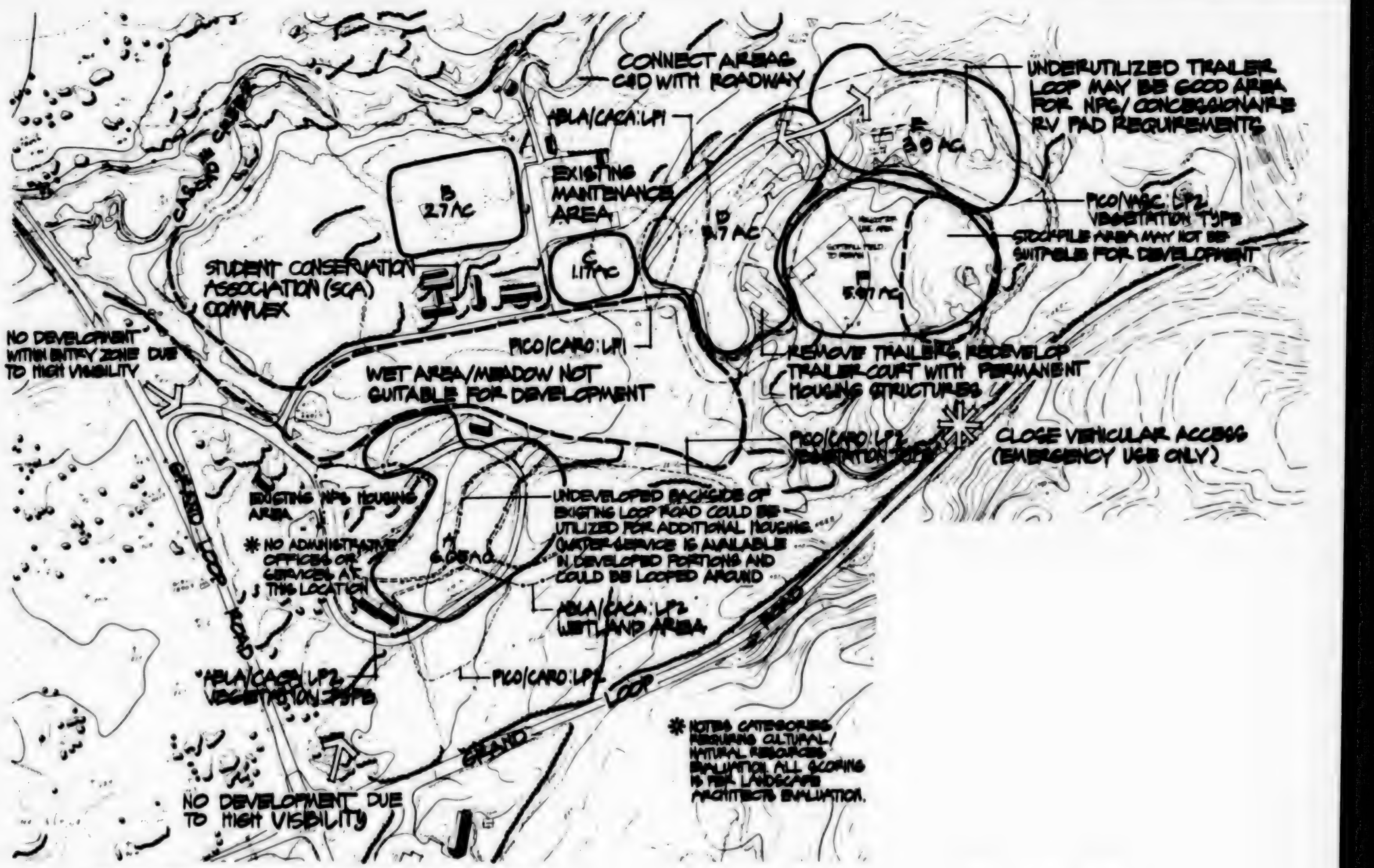


EXISTING CONDITIONS

YELLOWSTONE NATIONAL PARK

Canyon Village Employee Housing

101 / 40269 / May 92

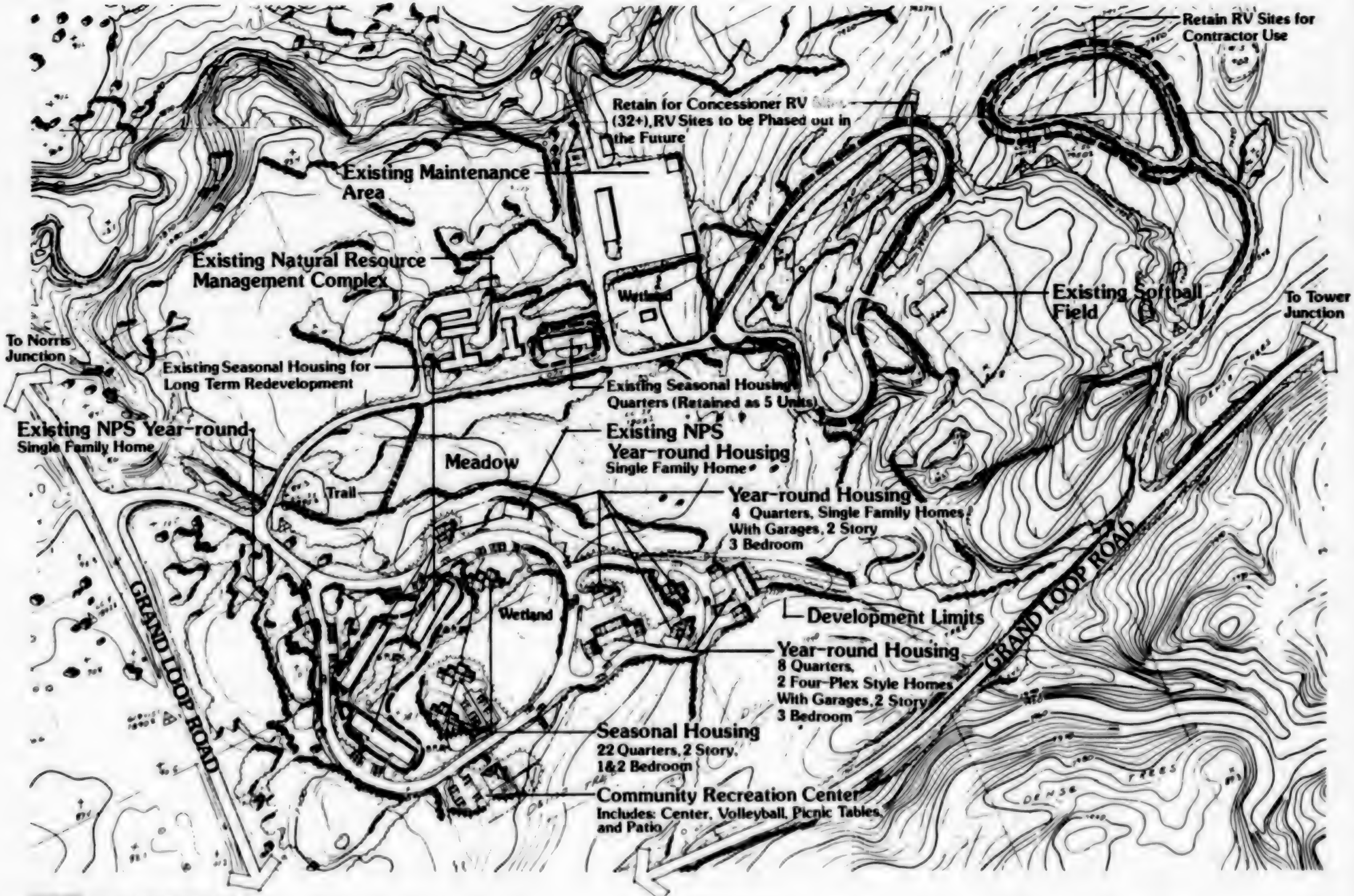

CONNECT AREAS C&D WITH ROADWAY
UNDERUTILIZED TRAILER LOOP MAY BE GOOD AREA FOR NPS/CONCESSIONAIRE RV PAD REQUIREMENTS
ABLA/CACA: LP1
E 3.0 AC
B 2.7 AC
EXISTING MAINTENANCE AREA
C 1.1 AC
D 3.7 AC
F 5.47 AC
PICO/NASC: LP2 VEGETATION TYPE
STOCKPILE AREA MAY NOT BE SUITABLE FOR DEVELOPMENT
STUDENT CONSERVATION ASSOCIATION (SCA) COMPLEX
CASCADE CREEK
NO DEVELOPMENT WITHIN ENTRY ZONE DUE TO HIGH VISIBILITY
PICO/CARO: LP1
REMOVE TRAILERS, REDEVELOP TRAILER COURT WITH PERMANENT HOUSING STRUCTURES
WET AREA/MEADOW NOT SUITABLE FOR DEVELOPMENT
CLOSE VEHICULAR ACCESS (EMERGENCY USE ONLY)
PICO/CARO: LP2 VEGETATION TYPE
EXISTING NPS HOUSING AREA
UNDEVELOPED BACKSIDE OF EXISTING LOOP ROAD COULD BE UTILIZED FOR ADDITIONAL HOUSING. WATER SERVICE IS AVAILABLE IN DEVELOPED PORTIONS AND COULD BE LOOPED AROUND
* NO ADMINISTRATIVE OFFICES OR SERVICES AT THIS LOCATION
A 6.06 AC
ABLA/CACA: LP2 WETLAND AREA
*ABLA/CACA: LP2 VEGETATION TYPE
PICO/CARO: LP2
GRAND LOOP ROAD
GRAND LOOP ROAD
NO DEVELOPMENT DUE TO HIGH VISIBILITY
* NOTES CATEGORIES REQUIRING CULTURAL/NATURAL RESOURCES EVALUATION. ALL SCORING IS FOR LANDSCAPE ARCHITECTS EVALUATION.
NORTH

AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Canyon Village Employee Housing

101 / 40270 / May 92



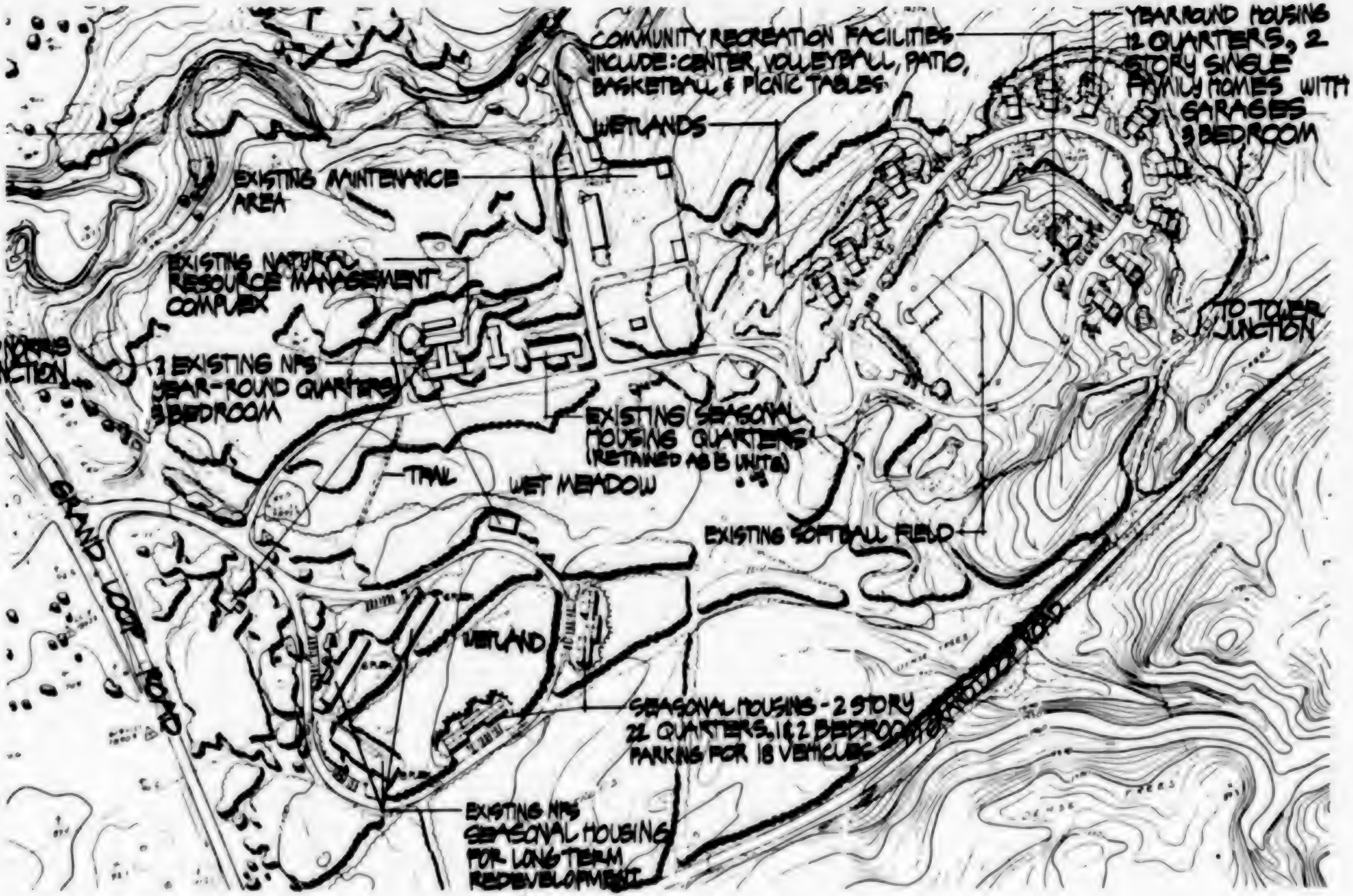
Retain RV Sites for Contractor Use
Retain for Concessioner RV Sites (32+), RV Sites to be Phased out in the Future
Existing Maintenance Area
Existing Natural Resource Management Complex
Wetland
Existing Softball Field
To Tower Junction
To Norris Junction
Existing Seasonal Housing for Long Term Redevelopment
Existing Seasonal Housing Quarters (Retained as 5 Units)
Existing NPS Year-round Single Family Home
Existing NPS Year-round Housing Single Family Home
Meadow
Trail
Year-round Housing 4 Quarters, Single Family Homes With Garages, 2 Story 3 Bedroom
Development Limits
Wetland
GRAND LOOP ROAD
GRAND LOOP ROAD
Year-round Housing 8 Quarters, 2 Four-Plex Style Homes With Garages, 2 Story 3 Bedroom
Seasonal Housing 22 Quarters, 2 Story, 1&2 Bedroom
Community Recreation Center Includes: Center, Volleyball, Picnic Tables, and Patio
DENSE TREES
DENSE TREES
north

THE PROPOSAL
YELLOWSTONE NATIONAL PARK
Canyon Village Employee Housing

PROGRAM SUMMARY

Retain 2 Year-round Quarters
Retain 25 Seasonal Quarters
Construct 12 Year-round Quarters
Construct 22 Seasonal Quarters

101 / 40271 / May 92


COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, VOLLEYBALL, PATIO, BASKETBALL & PICNIC TABLES
YEAR ROUND HOUSING 12 QUARTERS, 2 STORY SINGLE FAMILY HOMES WITH GARAGES 3 BEDROOM
WETLANDS
EXISTING MAINTENANCE AREA
EXISTING NATURAL RESOURCE MANAGEMENT COMPLEX
TO NORRIS JUNCTION
3 EXISTING NPS YEAR-ROUND QUARTERS 3 BEDROOM
EXISTING SEASONAL HOUSING QUARTERS (RETAINED AS 15 UNITS)
TRAIL
WET MEADOW
TO TOWER JUNCTION
EXISTING SOFTBALL FIELD
GRAND LOOP ROAD
WETLAND
SEASONAL HOUSING - 2 STORY 22 QUARTERS, 1 & 2 BEDROOM PARKING FOR 18 VEHICLES
GRAND LOOP ROAD
EXISTING NPS SEASONAL HOUSING FOR LONG TERM REDEVELOPMENT

ALTERNATIVE ONE
YELLOWSTONE NATIONAL PARK
Canyon Village Employee Housing

101 / 40272 / May 92

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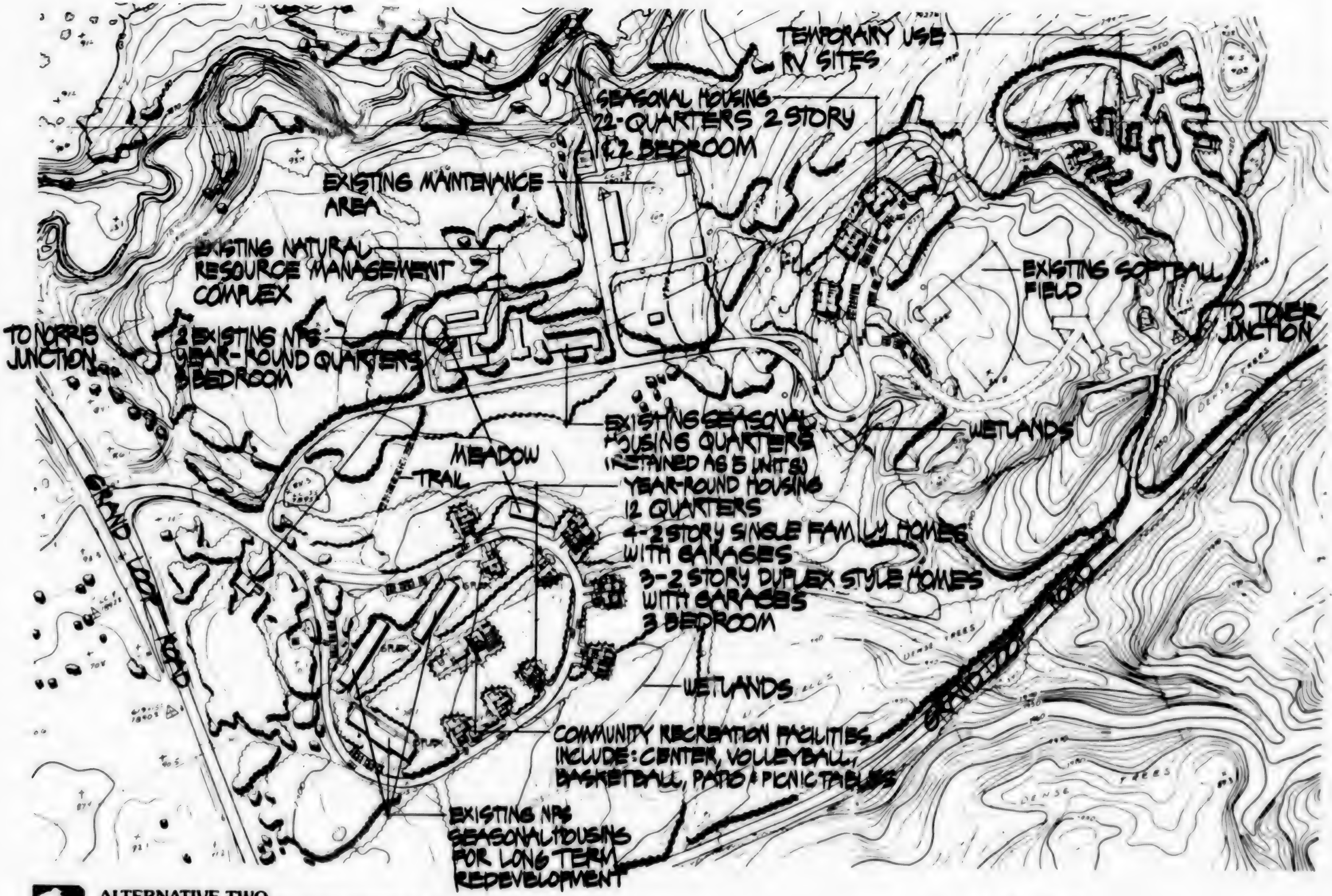

TEMPORARY USE RV SITES
SEASONAL HOUSING 22-QUARTERS 2 STORY 1&2 BEDROOM
EXISTING MAINTENANCE AREA
EXISTING NATURAL RESOURCE MANAGEMENT COMPLEX
TO NORRIS JUNCTION
2 EXISTING NPS YEAR-ROUND QUARTERS 3 BEDROOM
EXISTING SOFTBALL FIELD
TO TOWER JUNCTION
WETLANDS
EXISTING SEASONAL HOUSING QUARTERS (RETAINED AS 5 UNITS)
MEADOW
TRAIL
YEAR-ROUND HOUSING 12 QUARTERS
4-2 STORY SINGLE FAMILY HOMES WITH GARAGES
3-2 STORY DUPLEX STYLE HOMES WITH GARAGES
3 BEDROOM
WETLANDS
COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, VOLLEYBALL, BASKETBALL, PATIO & PICNIC TABLES
EXISTING NPS SEASONAL HOUSING FOR LONG TERM REDEVELOPMENT
GRAND LOOP ROAD
GRAND LOOP ROAD
DENSE TREES
DENSE TREES

ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

Canyon Village Employee Housing

101 / 40273 / May 92

NORTH

EAST ENTRANCE

PURPOSE AND NEED

The East Entrance area developed once the East Entrance Road was built. Appropriations for the construction of the East Entrance Road were approved by Congress in 1900. Actual road construction began in 1901, and the road opened to the public in 1903. In 1904, the Sylvan Pass Soldier Station was built at the park boundary to regulate travel into the park. In 1912, the Holm Transportation Company was given approval for the development of stables, a dining hall, and kitchen at the East Entrance. The following year the Wylie Permanent Camping Company constructed a camp complete with dining, kitchen, and stable facilities. After the introduction of automobiles into the park in 1915, the demise of coach travel led to the closing of the Holm and Wylie camps at the East Entrance. However, Sylvan Pass Lodge, which operated from 1917 to the 1940s, was built here to service visitors. The East Entrance has been operated continually since 1904.

Today, the East Entrance area is the staging area for National Park Service entrance gate functions, visitor protection, and emergency services for the eastern half of the Lake district. Housing for employees associated with area operations is provided here. No concessioner operates in the East Entrance area.

Employees who live within the East Entrance area are affiliated with the NPS ranger division. The total number of employees working in this area averages 7, with approximately 2 being year-round and 5 being seasonal. Housing is currently available at the East Entrance for all of these employees, but it is substandard.

Staffing projections indicate that a total of 11 NPS employees would eventually be duty-stationed at East Entrance. Because the only other nearby housing area is Lake Village, 27 miles away, housing would be provided for all employees in this area, with 2 housed year-round and 9 housed seasonally. In accordance with park policy, the existing 4 mobile homes and 2 transa-homes would be removed and replaced with permanent structures. No existing residences meet handicapped accessibility standards. All existing structures are visible from the road. Efforts to minimize the visual impacts of development, both existing and proposed, should be made.

The community plan for this area would include a community center and modest recreation facilities.

No maintenance facilities currently exist here. However, in order to serve this subdistrict more efficiently, refueling and storage facilities would be built.

Existing water supply and wastewater treatment systems do not meet current health and safety requirements. These systems would be upgraded to meet those requirements.

The East Entrance area is operational during the winter months, with 2 rangers living here year-round in mobile homes and available for visitor and emergency services. All services should be provided from a winterized facility.

ALTERNATIVES

In the development of the community planning proposal for the East Entrance Area, two alternatives were considered. These included a No-Action Alternative and the Proposal. Alternative sites, both inside and outside the park, were examined but no other alternatives were determined to be suitable. This is due to the severe limitations for construction posed by the natural conditions of the sites and also to the limited number of functions staged from this area.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

Only the locations shown for development on the map of the Proposal for East Entrance were considered suitable for development. All other locations would have required extensive new disturbance of ground; would have required construction in snow avalanche, debris flow hazard, wetland, additional grizzly bear habitat, or steeply sloped areas; or would have been more visible from public roadways.

No-Action Alternative

The No-Action Alternative would continue existing conditions in the East Entrance area. With the projected increase in future staffing, not all NPS employees could be provided with housing in the area, and some would need to commute to work on a daily basis. All employees who were housed in the East Entrance area would continue to live in substandard, non-winterized, mobile homes and transa-homes. These structures would continue to be visible to visitors passing by on the main road. Existing homes would be susceptible to damage from debris flows and snow avalanches. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Refueling functions and storage facilities would be unavailable. Water supply and wastewater facilities would continue to be unsafe.

The Proposal

This plan addresses the community needs identified for the East Entrance area through redevelopment of the existing residential area. New housing for NPS employees would be constructed, maintenance and operational concerns would be addressed, and the visitor experience would be improved. The new construction would occur in previously disturbed areas; however, some areas of timber and grassland currently growing in these areas would be disturbed.

Housing	The projected needs for park employee housing would be met with this plan. Two new two-story, year-round quarters would be located in the area where the storage facilities are currently located. New construction would meet NPS housing design standards. Nine seasonal quarters would be constructed in the area where the mobile homes and transa-homes are currently located. The new construction would require careful phasing in conjunction with the removal of existing temporary homes. New construction would meet NPS housing design standards. All new structures would be designed to resist potential debris flows and snow avalanches. With the completion of the new construction, at least 5 percent of the total number of employee quarters would be handicapped accessible.
Maintenance	A new refueling facility, with an accompanying storage shed, would be constructed along the existing entry road to the East Entrance residential area.
Recreational Facilities	A small community center with associated outdoor picnic facilities would be provided in the area located between the year-round and seasonal housing.
Visitor Experience	Visual screening of the new housing, community center, and refueling facilities would be achieved through the use of native plant material sited in strategic locations.
Utilities	The existing water supply and the wastewater treatment systems would be upgraded, either in their present location or in new locations.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the East Entrance area have developed primarily in glacial till deposits and material weathered from dark colored volcanic rocks on colluvial slopes. There are two basic soil types in this area:

> Glacial soils: These soils have developed from glacial till of andesitic composition. They are usually moderately coarse to medium textured and found as deep strata with many rock fragments. They have moderate nutrient levels and are moderately porous.
>
> Colluvial soils: These soils have developed from dark colored, andesitic rocks that have moved slowly downslope by gravity and weathered. These soils are usually moderately coarse in texture and found as deep to shallow strata with many rock fragments. They have moderate nutrient levels and can be highly porous.

The general surface soil textures are clay loams and subsoil textures are sandy clay loams, both containing 30-65 percent gravel. The soil surface is more than 12 inches thick. The soils have a slightly alkaline pH and high fertility. Depth to bedrock is more than 10 feet. The slopes are 0-20 percent, and the soil is moderately well-drained.

The East Entrance area is located in a steep valley. While the erosion potential is moderate, debris flow potential is relatively high. Historically there have been frequent occurrences of debris flows through the existing housing area; these are usually associated with severe storms and flash floods. No snow avalanches have been documented in the housing area. However, in the area west of the road into the housing area, avalanches large enough to reach the valley floor have an average recurrence time of 25 to 100 years.

Seismic activity in this area has been monitored. However, the 100-year earthquake occurrence has not been predicted for the area. Studies indicate the potential for a damaging earthquake is low.

No radon readings have been taken at the East Entrance.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils. Debris flows associated with severe storms and flash floods will continue to occur frequently through the housing area.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in accelerated deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to modify existing roads and parking areas and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 1.6 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential. Frequent occurrences of debris flows through the housing area, which are associated with severe storms and flash floods, would continue.

Removing existing road segments, mobile homes, and scattered buildings and using native plant materials to return sites to more natural conditions would restore 0.5 acres of soil and vegetation.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. Soils are easily excavated, but bedrock may be exposed in deeper cuts and excavations. The moderate nutrient level and moderate porosity of these soils indicates reclamation and site restoration would not be difficult. The long-term effects on soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake and debris flow-resistant structures is necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

VEGETATION

Affected Environment

Vegetation in the developed area of East Entrance is classified as an ABLA/THOC site with a mixed wet forest cover type. This classification describes an overstory strata dominated by lodgepole pine, Engelmann spruce, and subalpine fir interspersed with Rydberg's cottonwood and black cottonwood and an occasional whitebark pine. The shrub strata is comprised of common juniper, bearberry honeysuckle, Utah honeysuckle, creeping Oregon grape, and prickly rose. The forest understory herbaceous strata includes common yarrow, western red baneberry, milk-vetch, fireweed, sweet scented bedstraw, white geranium, sticky purple geranium, cow-parsnip, western solomon plume, mountain sweet-root, wood's rose, butterweed groundsel, northern goldenrod, and western meadow rue.

The site was surveyed by park personnel for sensitive plant species but none were found.

Exotic vegetation in the area includes musk thistle, spotted knapweed, Canada thistle, bull thistle, common hound's-tongue, curly dock, fanweed, yellow salsify, and white clover. Exotic grass species include smooth brome, common timothy, and Kentucky bluegrass.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 1.6 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short-term, but some deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to the vegetation would be insignificant after completion of the revegetation efforts.

WILDLIFE

Affected Environment

Wildlife species in the East Entrance area include deer, moose, and grizzly and black bears. Elk and bison are less common in this area. Smaller mammals include coyote, marmot, red squirrel, pine marten, weasel, porcupine, otter, beaver, snowshoe hare, mice, and voles.

Birds using this general area of the park include the endangered bald eagle and peregrine falcon, as well as great horned owl, great gray owl, Steller's jay, common raven, Clark's nutcracker, MacGillivray's warbler, blue grouse, white-crowned sparrow, Lincoln's sparrow, pine grosbeak, and red crossbill to name a few.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species suspected in the vicinity of the project area include tiger salamander, boreal toad, striped chorus frog, and Western spotted frog. Reptile species suspected include the wandering garter snake.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. The continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 1.6 acres of wildlife habitat, all of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, deer, and moose. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

East Entrance does not lie in any 100- or 500-year floodplain. However, it is located in a flash flood hazard area.

A wetland inventory of this area has been completed. Construction would not occur in areas identified as wetlands; however, wetlands areas exist adjacent to the proposed project area.

Environmental Consequences

No-Action Alternative

Frequent occurrences of debris flows associated with severe storms and flash floods would continue through the housing area. There would be no additional impacts to wetlands under this alternative.

The Proposal

Frequent occurrences of debris flows associated with severe storms and flash floods would continue through the housing area; new buildings would be designed to resist debris flows. Wetlands near construction areas would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that wetlands could be directly or indirectly impacted.

WATER QUALITY

Affected Environment

Middle Creek flows past the East Entrance area (south of the East Entrance Road) and empties into the Shoshone River. The condition of Middle Creek is considered nearly pristine. The existing development is not directly adjacent to this watercourse, and there are no measurable impacts upon the water quality of this stream due to the developed area.

The East Entrance Road is elevated and forms an effective levee between the creek and the housing area. Computer modeling indicates that this drainage can contain a maximum discharge of approximately 15,000 cubic feet per second. The recurrence interval of a flood with this or greater magnitude would be one thousand years.

A small stream is northeast of the housing area; this stream is usually dry by July or August. A bog lies between the housing area and the road.

The local domestic water supply is obtained from an unfenced spring box located just west of the East Entrance development. The water is treated with a hypochlorinator. The capacity of this system is not adequate for the existing developed area. There is no reservoir on the system and thus no structural fire protection. There is bacterial and possible thermal influence to this water supply.

Wastewater from the development passes through a series of septic tanks to a lift station. The lift station pumps the wastewater to a "North Dakota Mound" septic-leaching system. The treatment mound lies adjacent to the water treatment building. Currently, the wastewater treatment system is near capacity and is leaking.

Environmental Consequences

No-Action Alternative

Continued operations at the East Entrance would result in potential sources of surface and groundwater pollution in this area from road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program for replacing old or leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The domestic water supply system and the sewer system will require replacement in the immediate future, regardless of this proposal.

The Proposal

The capacity of the East Entrance domestic water supply would not be sufficient for all of the proposed development. Preferably a new source of water away from potential contaminants would be developed. Any further development of the East Entrance area would require the expansion and upgrading of the existing wastewater systems.

Construction activities would have a minor impact on surface and groundwater sources and adjacent wet meadow areas. Sources of impacts potentially include increased stream sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper attention to construction techniques, overall impacts on water quality would be minor and would not result in any long-term effects on the area's water resources.

FISHERIES

Affected Environment

Middle Creek provides habitat for the Yellowstone cutthroat, rainbow, and brook trout and the mountain whitefish.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on the fisheries. Impacts on fisheries from this development are minor and not significant.

The Proposal

It is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

AIR QUALITY

Affected Environment

Air quality within the East Entrance area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves, campfires, and motor vehicles are sometimes visible in the immediate area during temperature inversions.

There is no air quality monitoring equipment in the East Entrance area, and baseline data specific to this area is not available. The closest air quality monitoring station is to the west at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the northwest at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes during construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood-burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

Existing housing at the East Entrance is visible to the public traveling in either direction on the East Entrance Road. The light-colored temporary units do not blend with the surrounding forest. The view for residents from most units is of the entrance station, which is a large modern-looking, peaked structure, and of the East Entrance Road.

Environmental Consequences

No-Action Alternative

Visual quality would continue to degenerate as the existing buildings deteriorate.

The Proposal

The removal of existing housing units and mobile homes from the East Entrance housing area, and their replacement with units which have been designed to blend with the natural environment, would improve the visual quality of the East Entrance area. However, the new development would continue to be visible from the East Entrance Road. Nighttime light pollution from the area would increase.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in and adjacent to the East Entrance government housing area. The proposed project would be on the north side of the highway and extend east to the park boundary. The area has been intensively surveyed in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and no archeological sites were documented (Johnson 1989, Cannon 1991). There are no significant historic structures in the vicinity of the government housing area. Several historic features in the area have been recorded and mapped; these include an old roadbed and a pump. A formal determination of eligibility to the National Register, in consultation with the Wyoming State Historic Preservation Office, is still needed for these features.

Environmental Consequences

There are no known significant cultural resources in the area proposed for development that could potentially be affected by the proposed project. The roadbed and pump are outside the area of potential effects. If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The hub of visitor use in this area is the entrance station. According to National Park Service records, during the period January 1 through December 31, 1990, the East Entrance was the point of entry for 18 percent of Yellowstone's visitors. A vault toilet and parking area are located just within the park boundary. Middle Creek is near the entrance road and is a popular location for fishing.

During the winter months, the road from Cody, Wyoming, to the park is plowed to Pahaska Tepee, two miles outside the park boundary. From here, the road is unplowed and is used for oversnow vehicle access into the park.

The physical condition of the housing area may affect visitor use by creating an adverse visual impact.

Environmental Consequences

No-Action Alternative

Under this alternative, the existing mobile homes would remain, lessening the visual quality of the visitor experience. Visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected due to low NPS employee morale.

The Proposal

Under this alternative, the visual quality of the developed area would be improved and visitor services could be improved, due to higher NPS employee morale.

NATIONAL PARK SERVICE OPERATIONS

Affected Environment

The National Park Service (NPS) administers visitor services, visitor protection and emergency services for the eastern half of the Lake Subdistrict from this area. The NPS operates an entrance station/ranger office, government gasoline pump, and water supply and wastewater treatment systems at this site. NPS employee quarters consist of 2 transa-homes and 4 mobile homes, all old and sub-standard. During peak season, the NPS employs an average of 7 employees at the East Entrance. Cody, Wyoming (located 53 miles east of the area), is the closest town to East Entrance and is not considered to be within a reasonable commuting distance.

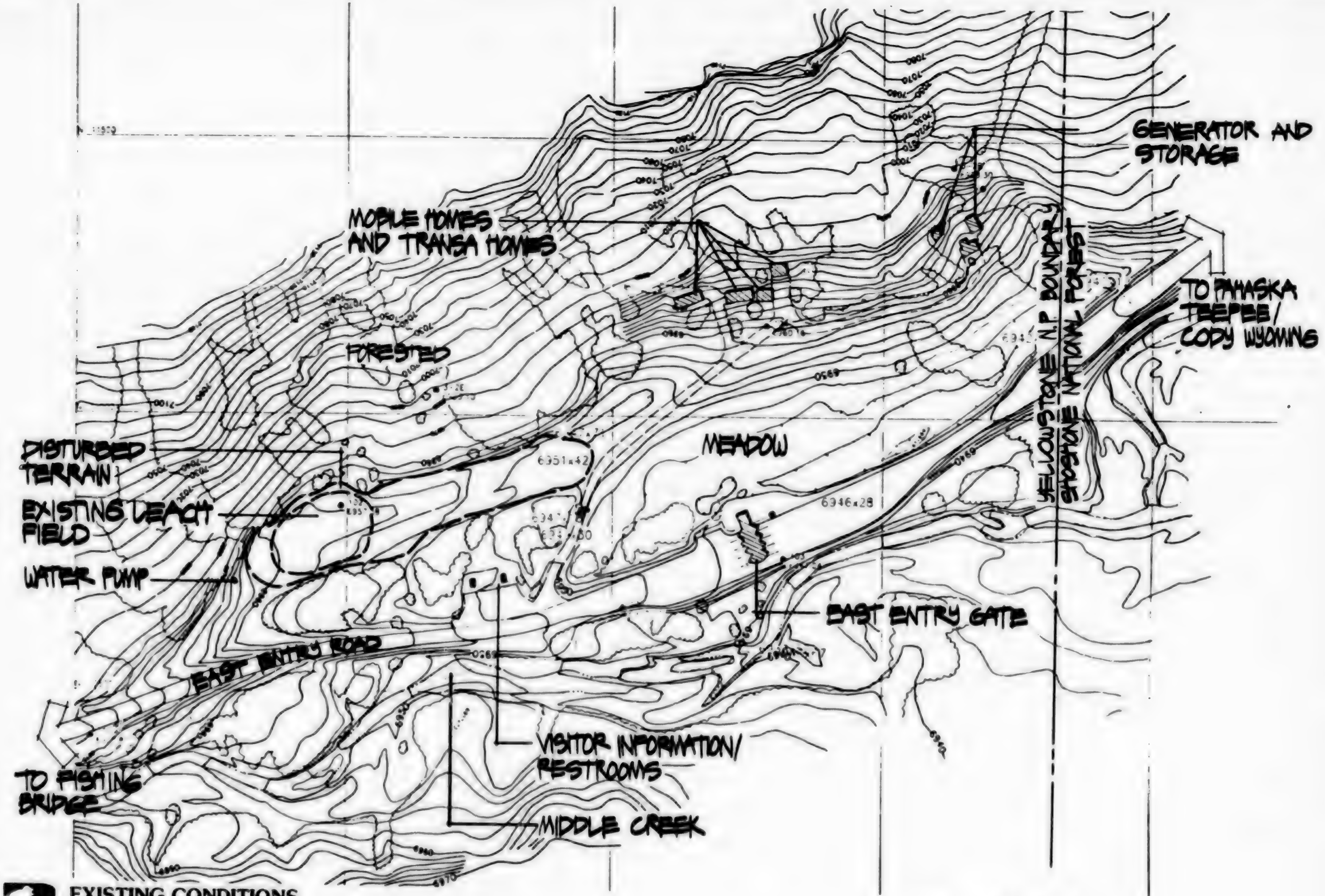
Environmental Consequences

No Action Alternative

This alternative would have no immediate adverse impacts on NPS operations in the East Entrance area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could create an adverse impact on the National Park Service's hiring ability and, therefore, on their operations.

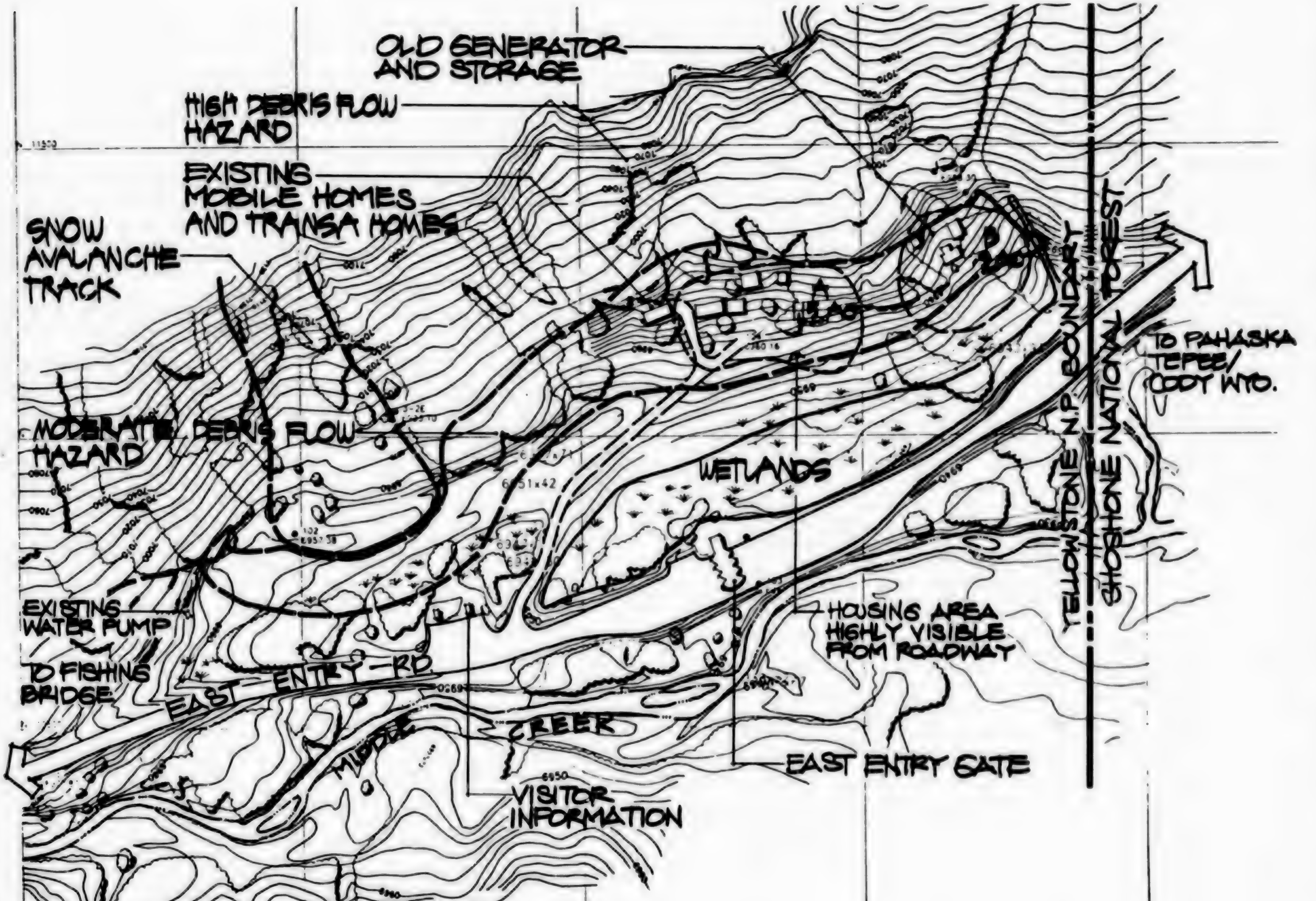
The Proposal

The Proposal would meet the NPS program requirements for housing. Constructing new housing units for NPS employees would improve employee morale by providing better housing with increased privacy and additional living and storage space, and by alleviating overcrowding. Recreational and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the Proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity and associated noise and dust could have an adverse effect on residents during the construction phase. This would be a short-term adverse effect. There would be no known long-term adverse effects.



EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
East Entrance Employee Housing

101 / 40274 / May 92

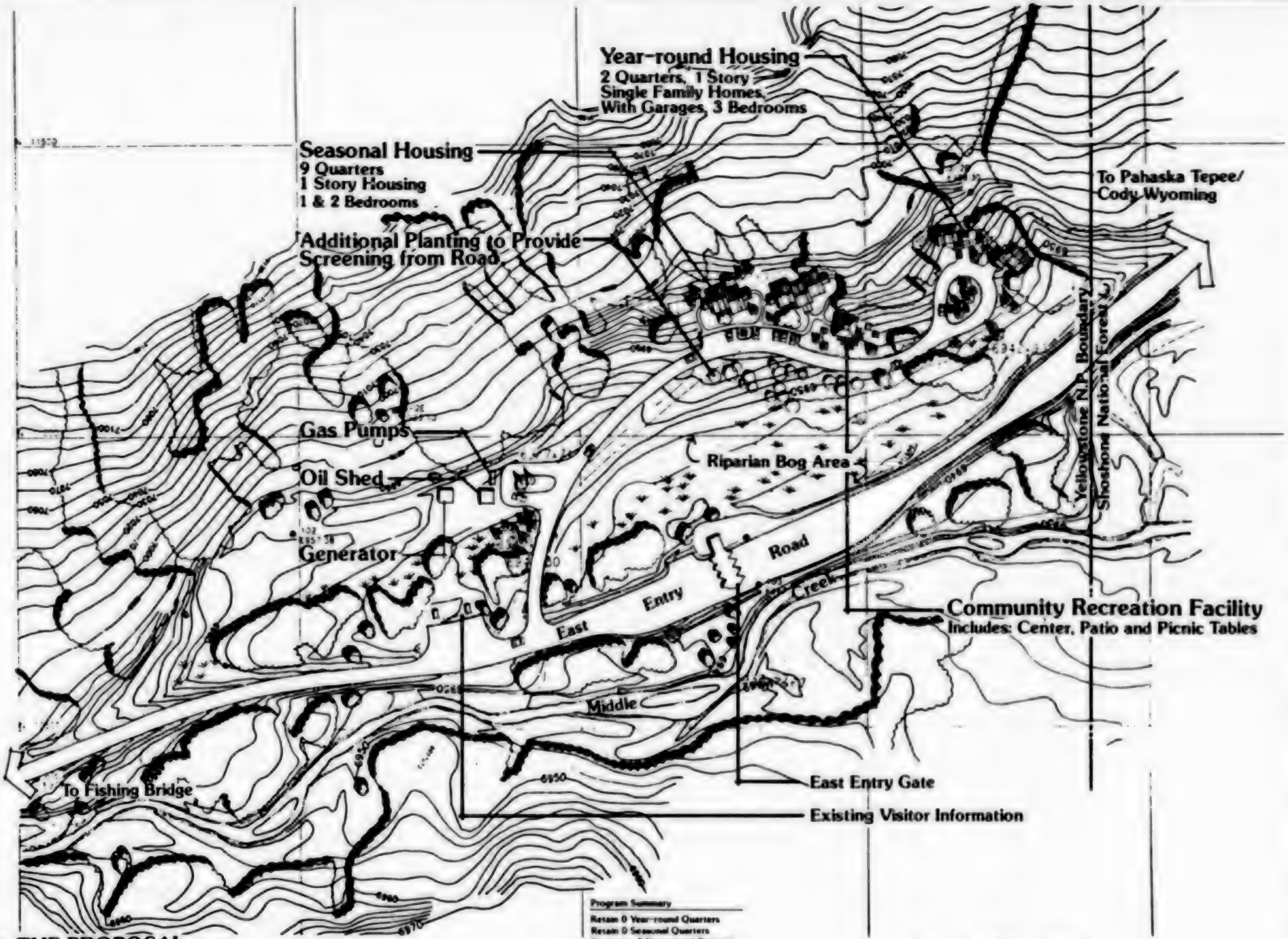

OLD GENERATOR AND STORAGE
HIGH DEBRIS FLOW HAZARD
EXISTING MOBILE HOMES AND TRANSA HOMES
SNOW AVALANCHE TRACK
MODERATE DEBRIS FLOW HAZARD
WETLANDS
TO PAHASKA TEPEE/ CODY WYO.
YELLOWSTONE N.P. BOUNDARY
SHOSHONE NATIONAL FOREST
EXISTING WATER PUMP
TO FISHING BRIDGE
EAST ENTRY RD
MIDDLE CREEK
HOUSING AREA HIGHLY VISIBLE FROM ROADWAY
EAST ENTRY GATE
VISITOR INFORMATION

AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

East Entrance Employee Housing

101 / 40275 / May 92



Program Summary

Retain 0 Year-round Quarters
Retain 0 Seasonal Quarters
Construct 2 Year-round Quarters
Construct 9 Seasonal Quarters

THE PROPOSAL
YELLOWSTONE NATIONAL PARK
East Entrance Employee Housing

101 / 40276 / May 92

GRANT VILLAGE

PURPOSE AND NEED

Grant Village is located south of West Thumb, on Yellowstone Lake. The road from Old Faithful to West Thumb was opened in 1892. Passengers traveling by stage from Old Faithful to their next night's lodging at Lake would stop at a lunch station at the West Thumb of Yellowstone Lake. The West Thumb Soldier Station was constructed in 1904 to monitor activity in this area. In the same year, a fish hatchery was constructed at West Thumb. Over the years, accommodations including camping, lodging, food, gas, and souvenir services were developed. Planning began in 1947 for the relocation of the West Thumb complex at a distance away from the thermal features in order to protect the scenic and geological values of the area. However, no construction funds were available during the post-war years. Finally, in 1966, as part of the service-wide Mission 66 program, new roads, a campground, comfort stations, a visitor center, and marina were built in the area now known as Grant Village.

Today, the National Park Service stages their maintenance operations, resource and visitor protection, emergency services, and interpretive functions for the Grant Village Subdistrict from this area. In addition, the NPS, concessioner operators, and utility contractors provide housing for their employees in this area.

National Park Service employees who live within this area are affiliated with the NPS ranger, interpretation, and maintenance divisions. The total number of employees working in this area averages 54, with approximately 12 being year-round and 42 being seasonal. While existing housing will accommodate all 12 year-round employees, only 37 seasonal employees can be accommodated. The remaining four to five employees must commute to Grant Village from Lake Village or Old Faithful.

National Park Service staffing projections indicate that a total of 66 government employees would eventually be duty-stationed at Grant Village. Housing would be provided for all employees in this area, with 14 housed year-round and 52 housed seasonally. In accordance with park policy, the 8 existing mobile homes would be removed and replaced with permanent structures. Existing year-round residences can be used for the foreseeable future, given modest renovation and maintenance. Existing seasonal residences are in poor condition and could be more effectively rebuilt than renovated (no existing buildings are considered historic). Only one existing residential quarters meets handicapped accessibility standards.

The existing structures in the NPS employee area are visible from the entrance road to the Village. Improvements in this area would be no closer to the road than any existing structures. In addition, critical bear habitat has been identified along three streams near the existing developed area. Improvements in the employee area would be kept a significant distance from these streams.

The community plan for this area would include a community center and modest recreation facilities.

Existing NPS maintenance facilities need additional storage space but are adequately winterized to serve current and projected needs.

The existing ranger station is of adequate size but is not properly winterized; this would be done.

An average of 390 people are employed by four different concessioners in the Grant Village area. Approximately 135 of these employees are housed in the seasonal RV park near the end of the old marina road. The remaining 255 employees are housed in dormitories and cabins in a separate area west of the seasonal RV park. Staffing projections indicate that a total of 478 concessioner employees would eventually require housing in the Grant Village area. In addition, a varying number of utility contractors require RV spaces on an irregular basis.

The Grant Village concessioner facilities are not operational during the winter. However, the main roads are maintained for snow vehicle use; ranger and maintenance services would need to be provided from winterized facilities at Grant Village in order to serve the needs of visitors and protect the resources of the park.

ALTERNATIVES

In the development of the community planning proposal for the Grant Village area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan for Park Employee Housing, a number of locations in the Grant Village area were evaluated for their suitability to support employee housing. Of these areas, portions of Area "A" were considered unsuitable for development due to the extensive existing forest. Portions of Area "C" were also considered unsuitable for development due to the existence of prime grizzly bear habitat and the visibility of the area from the road to the campground. Area "B" was considered suitable for development provided that any new construction was no closer to the road than the existing structures. Areas "D" and "E" were considered most suitable for development. In addition to these general parameters, other site specific concerns were considered in developing the range of acceptable alternatives; alternatives were not pursued if they poorly integrated uses in the area.

For Concessionaire Employee Housing, Area "A" was considered unsuitable for development, due to concerns for structural stability on this old landfill site. Area "B" was considered most suitable for development, even though some trees must be removed to expand the housing area beyond its current limit.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Grant Village area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Many NPS and concessioner employees who were housed in the area would continue to live in substandard mobile homes. Handicapped accessible housing would be available to only one residence. No community recreation facilities or common gathering areas would exist. The existing ranger station would not be winterized.

The Proposal

This plan addresses the community needs identified for the Grant Village area through redevelopment of several existing areas and development of some additional new areas. Additional housing for NPS and concessioner employees would be added, and maintenance and operational concerns would be addressed. Most of the new development would occur in disturbed areas.

Housing

The projected needs for park employee housing would be met with this plan. Seven new two-story, year-round quarters would be added in two separate locations; 5 would be located around the existing year-round residence closest to the main road, and 2 would be located north of the 2 existing year-round residences within the road loop. In addition to these 7 new quarters and 3 existing quarters, 4 other quarters in an existing building would be retained, for a total of 14 year-round quarters. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. Year-round and seasonal quarters would be intermingled. New construction would meet NPS housing design standards.

Fifty-two seasonal quarters would be provided in newly constructed units. Thirty-two employees would be housed in two-story units in two separate locations; eight quarters would be located south of the existing year-round four-plex, and 24 quarters would be located in the area currently occupied by mobile homes. In addition, twenty quarters in three existing substandard buildings would be rebuilt in the same location south of the maintenance yard, matching the design of other new construction. The new construction would require careful phasing in conjunction with the removal of existing mobile home and substandard buildings. New construction would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total NPS employee quarters would be handicapped accessible.

In order to meet the concessioner's needs for employee quarters, 44 new quarters (housing 88 employees) would be provided, utilizing both RV sites and dormitory rooms. At present, 79 RV sites are available, but only 69 are in use. Along with these 10 inactive RV sites, 16 new RV sites would be added, for a total of 95 sites housing 187 employees. These sites would be reconfigured from the current linear arrangement into loops. This would provide a better buffer between these units and the existing sewage treatment plant and would arrange the units in a more visually pleasing manner. A long-term plan to entirely phase out these RV sites has also been prepared as part of this Proposal; a scenario for phasing dormitory units into the area proposed for seasonal RV sites is shown on an accompanying drawing. In addition to these seasonal RV sites, 18 dormitory rooms (housing 36 employees) would be added at the west end of the area where the existing dormitories and cabins are. Combined with the existing 85 dormitory rooms (housing 141 employees) and 13 cabins (housing 114 employees), the concessioner's need for 478 employee quarters would be met.

Ranger Facilities

The existing ranger station would be winterized.

Recreational Facilities

In the NPS employee area, a small community center would be incorporated into the new seasonal housing area located east of the maintenance area. In addition, a new softball field would be built in the old gravel borrow area across the main road and west of the ranger station.

Wildlife Habitat

New development would be kept a substantial distance (360 feet) from the stream beds identified as bear habitat.

Alternative One

This plan partially addresses the community needs identified for the Grant Village area through redevelopment of several existing areas and development of several additional new areas. Additional housing for NPS and concessioner employees would be added, and maintenance and operational concerns would be addressed. Much of the new development would occur in undisturbed areas.

Housing

The projected needs for park employee housing would be met with this plan. Seven new two-story, year- round quarters would be added in two locations; 6 in a cluster around the existing year-round residence closest to the main road, and 1 south of the existing year-round four-plex. In addition to these 7 new quarters and 5 existing quarters, 2 other existing quarters in the center of the existing residential area loop would be retained, for a total of 14 year-round quarters. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. Year-round and seasonal quarters would be intermingled. New construction would meet NPS housing design standards.

Housing for fifty-two seasonal employees would be provided in a combination of existing and newly constructed units. Twenty-two employees would be housed in two-story buildings located west of the main road and north of the existing disturbed gravel borrow area. Ten additional employees would be housed in mobile homes in existing mobile home sites, contrary to park policy. In addition, 20 quarters in three existing substandard buildings located south of the maintenance yard would be rehabilitated to provide acceptable seasonal housing. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. New construction and rehabilitation would meet NPS housing design standards.

In order to meet the concessioner's needs for employee quarters, 44 new quarters (housing 88 employees) would be provided, utilizing both RV sites and dormitory rooms. At present, 79 RV sites are available, but only 69 are in use. Along with these 10 inactive RV sites, 16 new RV sites would be added, for a total of 95 sites (housing 187 employees). These sites would be reconfigured from the current linear arrangement into loops. This would provide a better buffer between these units and the existing sewage treatment plant and would arrange the units in a more visually pleasing manner. A long-term plan to entirely phase out these RV sites has been prepared as part of the Proposal; a similar phasing plan, introducing dormitories over a period of time, would be utilized with this alternative. In addition to these RV sites, 18 dormitory rooms (36 quarters) would be added north of the reconfigured mobile home sites. Combined with the existing 85 dorm rooms (141 quarters) and 13 cabins (114 quarters), the concessioner's needs for 478 quarters would be met.

With the completion of the new construction, at least 5 percent of the total NPS employee quarters would be handicapped accessible.

Ranger Facilities

The existing ranger station would be winterized.

Recreational Facilities

In the NPS employee area, a small community center would be added east of the mobile homes retained for seasonal use. In addition, a new softball field would be built in the old gravel borrow area across the main road, west of the ranger station.

Wildlife Habitat

New development would not be kept a substantial distance from the stream beds identified as bear habitat. A buffer of only 100 feet would be maintained.

Alternative Two

This plan partially addresses the community needs identified for the Grant Village area through redevelopment of several existing areas and development of several additional new areas. Additional housing for NPS and concessioner employees would be added, and maintenance and operational concerns would be addressed. Much of the new construction would occur in undisturbed areas.

Housing

The projected needs for park employee housing would be met with this plan. Eight new two-story, year-round quarters would be added in two locations; 4 quarters north of the existing year-round four-plex and 4 quarters south of the existing year-round four-plex. In addition to these 8 new quarters and 4 existing quarters, 2 other existing quarters (located in the center of the existing residential area loop) would be retained, for a total of 14 year-round quarters. One other existing year-round residence, located in the western portion of the housing area, would be removed in order to site the new community center. The new construction would require phasing in conjunction with the removal of existing mobile homes. Year-round and seasonal quarters would be intermingled. New construction would meet NPS housing design standards.

Fifty-two seasonal quarters would be provided in newly constructed units. Twenty-four employees would be housed in one and two-story buildings located in the area of existing mobile homes. Eight additional employees would be housed in mobile homes located in the existing gravel borrow area; the use of mobile homes would be contrary to park policy. In addition, 20 quarters in three existing substandard buildings would be rebuilt in the same area south of the maintenance yard, matching the design of other new construction. The new construction would require phasing in conjunction with the removal of existing mobile homes. New construction would meet NPS housing design standards. With the completion of the new construction, at least 5 percent of the total NPS employee quarters would be handicapped accessible.

In order to meet the concessioner's needs for employee quarters, the same scenario as described in Alternative One would be used for this alternative.

Ranger Facilities

The existing ranger station would be winterized.

Recreational Facilities

In the NPS employee area, a small community center and associated outdoor activities would be added in the area southwest of the maintenance yard. No room is available for a softball field. The new facilities would be somewhat closer to the main road than are existing facilities.

Wildlife Habitat

New development would be kept a substantial distance (360 feet) from the stream beds identified as bear habitat.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the Grant Village vicinity are formed from lake sediments. The surface and subsurface soil textures vary from very fine sandy loams, fine sandy loams, loams, sandy clay loams and loamy sand to loamy fine sand. Gravels make up 15-50 percent of the soil. The soil surface is non-existent in disturbed gravel pit and dump site areas. However, the soil surface is from 3-12 inches thick in undisturbed areas. The soils have a slightly acidic pH and moderate fertility. The gravel pit and dump site have slightly alkaline pH and extremely low fertility. Depth to bedrock is up to 30 feet. The area has slopes ranging from 0-20 percent and is well drained.

Seismic activity in this area has been monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 6.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences ranged from 6.9 to 9.2 picocuries/liter. This suggests that the potential for radon contamination is moderate for this area.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in deterioration of soils, primarily in the developed areas.

The Proposal

The emphasis of the proposed action would be to modify existing roads, parking areas, and RV spaces, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 12.5 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects on soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

Alternative One
Under Alternative One, construction would disturb 16.3 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two
Under Alternative Two, construction would disturb 12.1 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

All sites considered for development in the vicinity of the Grant Village Ranger Station and Maintenance area are in the ABLA/VASC habitat type, with either a mid-successional (LP2) or early successional (LP1) cover type.

The borrow pit area is currently disturbed and without vegetative cover, but was probably similar to adjacent plant communities.

The vegetation type is dominated by a lodgepole pine canopy with understory species of lodgepole pine, Engelmann spruce, subalpine fir, and whitebark pine. The herbaceous layer is dominated by the forbs silvery lupine, grouse whortleberry, fireweed, wild strawberry, heart-leafed arnica, rosy pussytoes, and northern goldenrod, and by the graminoids elk sedge and Wheeler's bluegrass.

The area in the vicinity of the concessioner's trailer court is a mid-successional forest type with a mixture of the ABLA/CAGE habitat type on the drier upland sites, and the ABLA/VASC habitat type in the lower depressions. The plant species are similar among these two types except that the grouse whortleberry cover increases and the elk sedge cover decreases in the wetter depressions.

None of the types are indicative of wetland plant communities, and no sensitive, threatened, or endangered plant species are present.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short term but would in time result in continued deterioration of vegetation, primarily in the developed areas.

The Proposal

The emphasis of the proposed action would be to modify existing roads, parking areas, and RV spaces and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 12.5 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short-term, but continued deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to the vegetation would be insignificant after completion of the revegetation efforts.

Alternative One
Under Alternative One, construction would disturb 16.3 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two
Under Alternative Two construction would disturb 12.1 acres. The types of impacts would be similar to those described for the proposed action.

Total impacts of Alternative Two would be minor in the short-term, but would in time result in gradual deterioration of existing vegetation.

WILDLIFE

Affected Environment

Grant Village is located near the shore of Yellowstone Lake. Although the housing area is not directly adjacent to the shoreline, three tributary streams lie on either side of the developed area, and are used by spawning Yellowstone cutthroat trout in spring to early summer. Large mammals in the area include grizzly and black bears, deer, elk, and moose. Small mammals living in the area include coyote, otters, muskrats, red squirrels, pine martens, snowshoe hares, mice, and voles.

One of the more prominent bird species in the immediate village area is the osprey. Other birds using this general area of the park are bald eagles, great gray owls, Barrow's goldeneye, common merganser, ruffed grouse, great horned owl, woodpeckers, gray jay, Clark's nutcracker, common raven, mountain chickadee, American robin, yellow-rumped warbler, chipping sparrow, and dark-eyed junco.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include Western spotted frog and possibly the tiger salamander, boreal toad, and striped chorus frog. Reptile species include common garter snake and possibly the wandering garter snake and rubber boa.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 12.5 acres of wildlife habitat, most of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 16.3 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 12.1 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project at would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

Grant Village is not in any 100- or 500-year floodplains or flash-flood hazard area.

A wetlands inventory of this area has been completed. No wetlands were identified in the vicinity of the project areas.

Environmental Consequences

No-Action Alternative
There would be no impacts to wetlands under this alternative.

The Proposal
There would be no impacts to wetlands under this alternative.

Alternative One
There would be no impacts to wetlands under this alternative.

Alternative Two
There would be no impacts to wetlands under this alternative.

WATER QUALITY

Affected Environment

The local domestic water supply is acquired from Yellowstone Lake (located approximately 1000 feet from the concessioner employee housing area and over one-half mile from the park employee housing area) and filtered through a water treatment plant. Water quality is excellent and there is an adequate water supply for the existing and proposed development. The system has a storage capacity of two million gallons.

The Grant Village wastewater treatment plant consists of two aerated lagoons in series followed by three percolation ponds.

Environmental Consequences

No-Action Alternative

Continued operations at Grant Village would result in potential sources of surface and groundwater pollution in this area, including stream degradation from road maintenance; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program for replacing leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The Proposal

Construction activities would have minor impacts to surface and groundwater sources. Sources of impacts potentially include increased stream sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas.

Given proper attention to construction techniques, no significant impact on the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects on the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

FISHERIES

Affected Environment

Yellowstone Lake provides habitat for the Yellowstone cutthroat trout and longnose sucker.

The Grant housing area is bordered by two tributary streams. The main branch of Sandy Creek flows to the west of the NPS developed area, within

250 feet at the closest point; this is a major trout spawning stream. A branch of Sandy Creek flows to within 120 feet east of the NPS developed area; this stream is ephemeral, supporting little or no spawning activity.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts to the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Any sediment in Sandy Creek would have an adverse effect on trout because sand can cover the graveled areas required for spawning. In order to avoid siltation during the construction phase, there would be no crushing of stream banks or removal of timber which would otherwise hold stream banks, no material would be pushed over the sides of stream banks, and machines would be kept away from banks.

Alternative One

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Grant Village area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Temperature inversions, particularly in winter, often retain ground fog, thermal fog, exhaust, and wood smoke from stoves in the area. In the summer, campfires occasionally create a visible haze.

There is no air quality monitoring equipment in the Grant Village area, and baseline data specific to this area is not available. The closest air quality monitoring station is to the north at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located further north at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased impacts on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes during construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood-burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One are not expected to occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The Grant Village residential and maintenance area is located away from visitor use areas but is somewhat visible from the Grant Village entrance road. The development includes a maintenance facility, mobile home court, several multi-family dwellings, and three single-family homes. Most of the permanent structures in the Grant Village residential area were constructed during the 1960s, which is evident in the architectural style of the buildings. The area is dominated by a mature lodgepole forest.

The existing concessioner mobile home court is completely removed from visitor use areas. A lodgepole pine forest surrounding the trailer court creates a feeling of seclusion.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal
Proposed housing development north of the entrance road may be slightly more visible to the public from the main road due to the increased number of buildings close to the road. However, these buildings would be designed and finished in a visually unobtrusive manner. Additional mobile home spaces which are proposed adjacent to the existing concessioner trailer court would not be visible from visitor use areas. However, nighttime light pollution from the area would increase.

Removal of mobile homes from the NPS residential area and replacement with permanent structures which have been designed to blend with the natural environment would improve the visual quality of the Grant Village residential area.

Alternative One
Impacts to the visual quality of the area would be similar to the proposed action.

Alternative Two
Impacts to the visual quality of the area would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located within the Grant Village developed area. Archeological surveys of the West Thumb/Grant Village area (Taylor et al. 1964, Samuelson 1981, Cannon 1991) have recorded seven archeological sites. None of these sites would be affected by the proposed project. There are no historic structures in the area proposed for development.

An intensive archeological survey of the area to be affected by the proposed project was conducted, in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, and no archeological sites were documented (Cannon and Phillips 11991). The area has been disturbed by previous construction.

Environmental Consequences

For all alternatives, there are no known cultural resources in the proposed development area. If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

Grant Village is situated on the shores of the Yellowstone Lake and is in close proximity to the West Thumb geyser basin. During the summer months, the National Park Service maintains a 403-site campground at Grant Village. An NPS visitor center is a hub for interpretive activities and information and features natural history exhibits. Visitors can obtain permits, information, and emergency services at the ranger station, which is located near the entrance to Grant Village. Concessioners offer overnight accommodations, a gift shop, a grocery store, a mini-store, casual and formal dining, and a service station.

During winter months, NPS employees are housed in the area, and maintenance facilities are operated. Most visitor use occurs at the West Thumb warming hut and restrooms, two miles north of Grant Village.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact.

Environmental Consequences

No-Action Alternative

Under this alternative, visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected, due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. More employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE AND CONCESSIONER OPERATIONS

Affected Environment

The National Park Service administers their maintenance operations, visitor services, interpretation, protection, and emergency services for the Grant Subdistrict from this area. The NPS operates a 403-site campground, a visitor center, ranger station, and water and sewage treatment facilities. National Park Service employee quarters consist of 3 single-family residences, 3 apartment buildings, 1 duplex residence, and 8 mobile homes. The quarters are located in the government housing area approximately one-half mile west of the visitor services area of Grant Village. During peak season, the NPS employs an average of 54 employees at Grant Village.

Concessioner facilities in the Grant Village area are provided by Hamilton Stores, Inc. (HSI), TW Recreational Services, Inc. (TWRS), Yellowstone Park Service Stations (YPSS), and Firebox, Incorporated.

HAMILTON STORES, INC.

Hamilton Stores operates one large general store (open from early June until mid-September) and one mini-store (open late May until late September). These facilities are located within the visitor services area of Grant Village, completely removed from the housing areas.

During peak season, HSI employs an average of 120 persons. Employees are housed in 37 mobile home sites (2 employees per mobile home). Twenty-six of these sites are located in the existing contractors' mobile home village, and 11 sites are located in the existing dormitory area. The remaining 46 employees are housed in a new dormitory which is located west of the contractors' camp. There are no HSI employees housed in the existing government housing area.

Traditionally, the majority of HSI employees have been over 50 years of age. These employees prefer private housing arrangements, either in mobile homes, adult dormitories, or apartments. Given the current limited availability of mobile home sites and dormitory rooms for couples, HSI requires that both members of a couple work in order to be assigned this type of housing.

HSI will continue their trend toward employing an older portion of the work force, requiring appropriate housing. HSI has estimated a need for ten additional mobile home sites to house 20 employees.

TW RECREATIONAL SERVICES, INC.

In the Grant Village area, TW Recreational Services operates a full service lodging facility with dining room and gift shop, as well as the Grant Village Steak House (open from early June until late September). These facilities are located in the visitor services area of Grant Village, completely removed from the housing areas.

During peak season, TWRS employs an average of 249 persons at Grant Village. Current TWRS employee housing includes 53 dormitory rooms, 52 rooms in cabins (located in the dormitory area), and 29 mobile home sites (located in the mobile home village). All rooms have two employees per room.

TWRS employment opportunities are labor intensive seasonal jobs: maid service, groundskeeping, table service, and kitchen help. This type of work generally appeals to a younger segment of the work force: those who are students or those who are at the beginning of their careers. These employees are usually satisfied with dormitory living.

TWRS has traditionally experienced a high rate of employee turnover. This dynamic work force requires TWRS to constantly hire new employees, sometimes resulting in temporary over-staffing.

Currently, TWRS requires their managers to work a six-day work week. It is the intent of TWRS to cut the managers work week to five days. This will require staffing levels to increase. Because of this increase, combined with the need to house occasional numbers of excess employees, TWRS projects a need for an additional 18 dormitory rooms and 16 mobile home sites in the Grant Village area.

YELLOWSTONE PARK SERVICE STATIONS

Yellowstone Park Service Stations operates a service station and repair service at Grant Village (open from early June until late September). This facility is located in the visitor services area of Grant Village, completely removed from the housing areas.

During peak season, YPSS employs an average of 16 persons. Current housing for Grant Village employees includes two mobile home sites and 9 dormitory rooms. This housing is not equipped with kitchen facilities, causing YPSS employees to rely on the TWRS employee dining room for food service. Because of this, YPSS's season of operation at Grant Village is limited by TWRS's season.

The majority of YPSS seasonal positions are labor intensive, typically performed by younger employees. In general, these employees are usually satisfied with dormitory living. Approximately 25 percent of the staff are female, who are often housed in TWRS housing.

Existing housing at Grant Village for YPSS employees is sufficient for the current and foreseeable future.

FIREBOX, INC.
Firebox operates one wood vending machine at the Grant Village Campground. One employee is housed in a mobile home in the Grant Village area.

Environmental Consequences

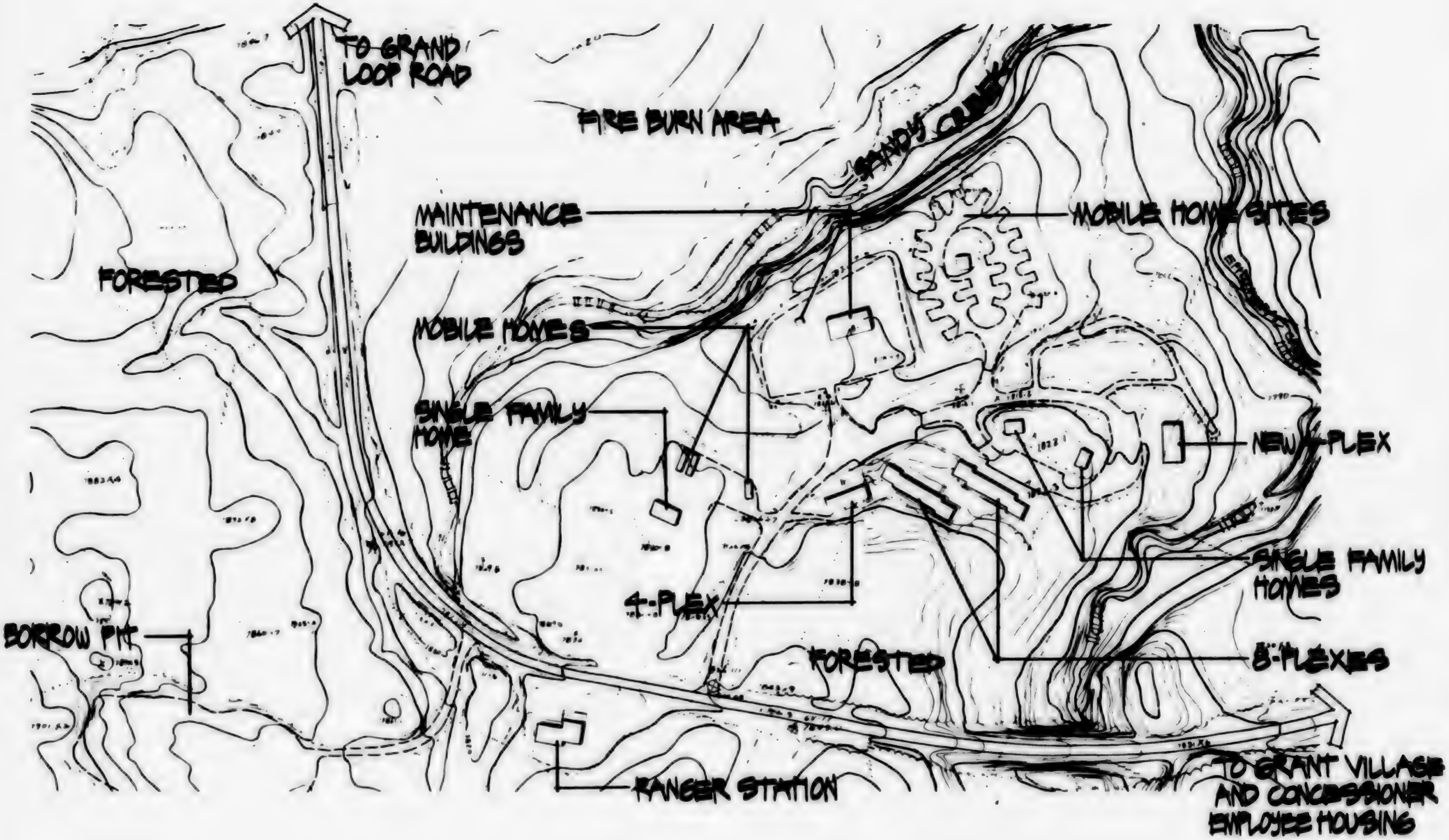
No-Action Alternative:
The No-Action Alternative would have no immediate adverse impacts on the NPS administrative or concessioner operations in the Grant Village area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could possibly create an adverse impact on the NPS and/or concessioner's hiring ability which could effect their operations.

The Proposal
The Proposal would meet the NPS and concessioners' program requirements for housing. Construction of new housing units would improve employee morale by providing better housing with increased privacy and additional living and storage space and by alleviating overcrowding. The proposed action separates the dormitory and mobile home functions, thereby housing employees of similar lifestyles in the same area. Recreation and community facilities would be improved. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity and associated noise and dust could have an adverse effect on residents near the area of construction. This would be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One
The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

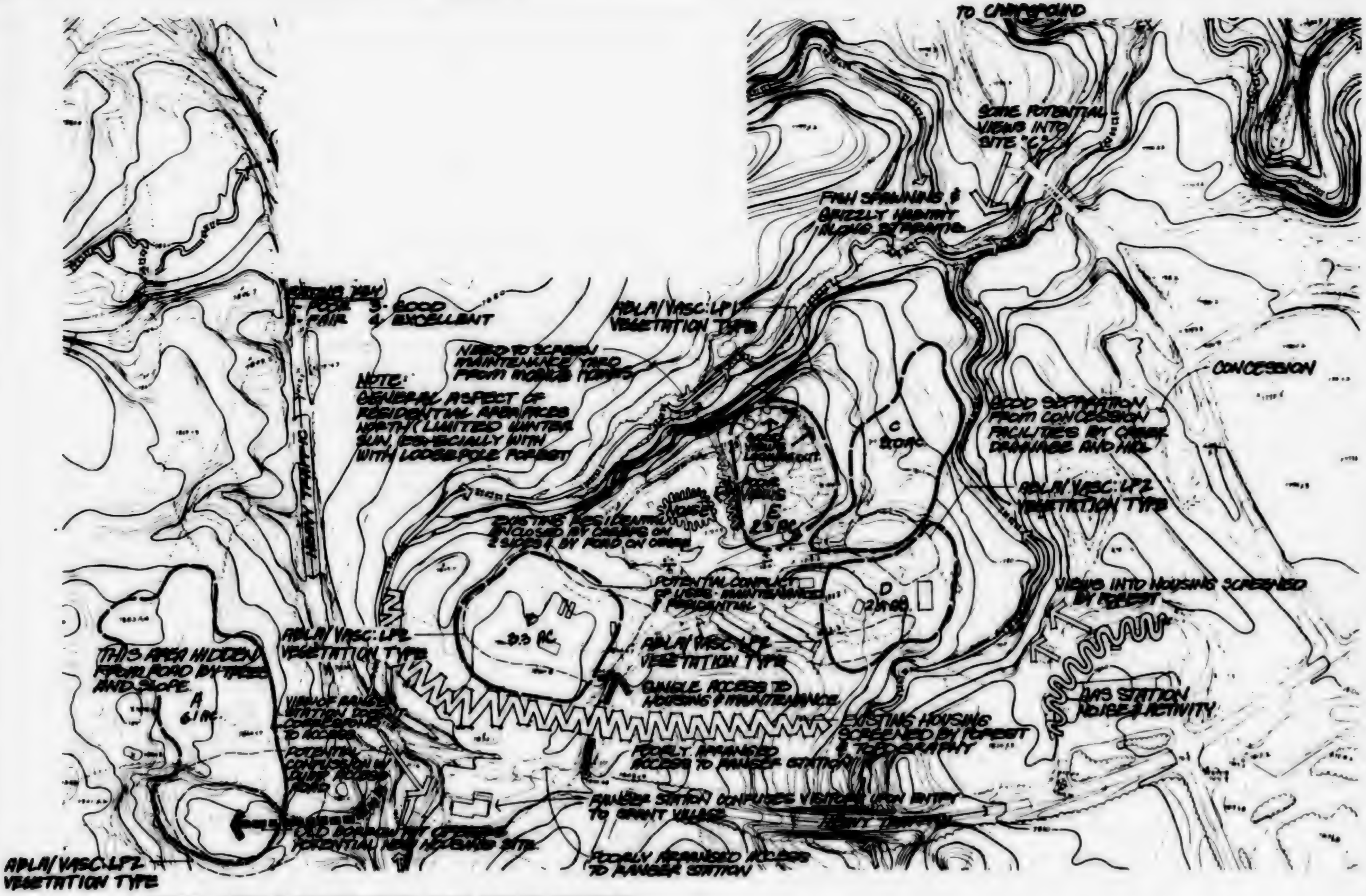
The effects of Alternative Two would be the same as those described under the Proposal.



EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
Grant Village Park Employee Housing

101 / 40277 / May 92

NORTH


TO CAMPGROUND
SOME POTENTIAL VIEWS INTO SITE "C"
FISH SPAWNING & GRIZZLY HABITAT ALONG STREAMS
RATING KEY
1- POOR 3- GOOD
2- FAIR 4- EXCELLENT
ABLA/VASC:LP1 VEGETATION TYPE
NEED TO SCREEN MAINTENANCE YARD FROM NOISE HORNS
NOTE: GENERAL ASPECT OF RESIDENTIAL AREA FACES NORTH (LIMITED WINTER SUN, ESPECIALLY WITH WITH LODGEPOLE FOREST
HEAVY TRAFFIC
CONCESSION
GOOD SEPARATION FROM CONCESSION FACILITIES BY CREEK DRAINAGE AND HILL
C
ABLA/VASC:LP2 VEGETATION TYPE
NOISE
E
2.5 AC
EXISTING RESIDENTIAL ENCLOSED BY CREEKS ON 2 SIDES & BY ROAD ON OTHER
POTENTIAL CONFLICT OF USES: MAINTENANCE & RESIDENTIAL
D
2 AC
VIEWS INTO HOUSING SCREENED BY FOREST
ABLA/VASC:LP2 VEGETATION TYPE
3.3 AC
ABLA/VASC:LP2 VEGETATION TYPE
THIS AREA HIDDEN FROM ROAD BY TREES AND SLOPE
A
6.1 AC
ABLA/VASC:LP2 VEGETATION TYPE
SINGLE ACCESS TO HOUSING & MAINTENANCE
GAS STATION NOISE & ACTIVITY
EXISTING HOUSING SCREENED BY FOREST & TOPOGRAPHY
VIEW OF RANGER STATION DOESN'T CORRESPOND TO ACCESS
POTENTIAL CONFUSION W/ DUMP ACCESS ROAD
POORLY ARRANGED ACCESS TO RANGER STATION
RANGER STATION CONFUSES VISITORS UPON ENTRY TO GRANT VILLAGE
HEAVY TRAFFIC
OLD BORROW PIT OFFERS POTENTIAL NEW HOUSING SITE
POORLY ARRANGED ACCESS TO RANGER STATION
ABLA/VASC:LP2 VEGETATION TYPE

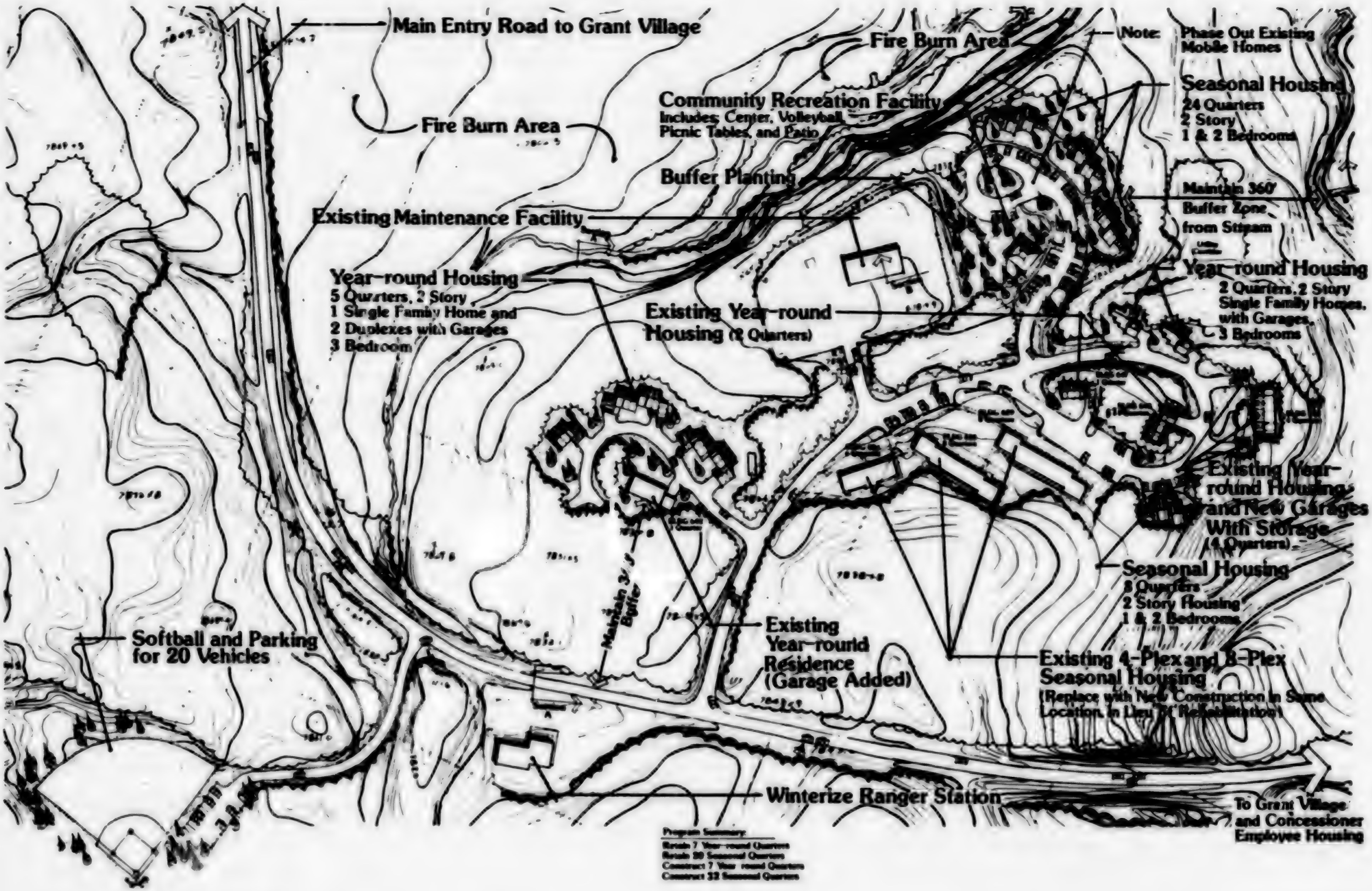
AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Grant Village Park Employee Housing

101 / 40278 / May 92

NORTH


Main Entry Road to Grant Village
Fire Burn Area
Fire Burn Area
Note: Phase Out Existing Mobile Homes
Community Recreation Facility
Includes: Center, Volleyball, Picnic Tables, and Patio
Seasonal Housing
24 Quarters
2 Story
1 & 2 Bedrooms
Buffer Planting
Maintain 360' Buffer Zone from Stream
Existing Maintenance Facility
Year-round Housing
5 Quarters, 2 Story
1 Single Family Home and
2 Duplexes with Garages
3 Bedroom
Existing Year-round Housing (2 Quarters)
Year-round Housing
2 Quarters, 2 Story
Single Family Homes, with Garages,
3 Bedrooms
Existing Year-round Housing and New Garages With Storage
(4 Quarters)
Seasonal Housing
8 Quarters
2 Story Housing
1 & 2 Bedrooms
Maintain 3/8 Buffer
Existing Year-round Residence (Garage Added)
Existing 4-Plex and 8-Plex Seasonal Housing
(Replace with New Construction in Same Location in Lieu of Rehabilitation)
Softball and Parking for 20 Vehicles
Winterize Ranger Station
To Grant Village and Concessioner Employee Housing
Program Summary:
Retain 7 Year-round Quarters
Retain 20 Seasonal Quarters
Construct 7 Year-round Quarters
Construct 32 Seasonal Quarters

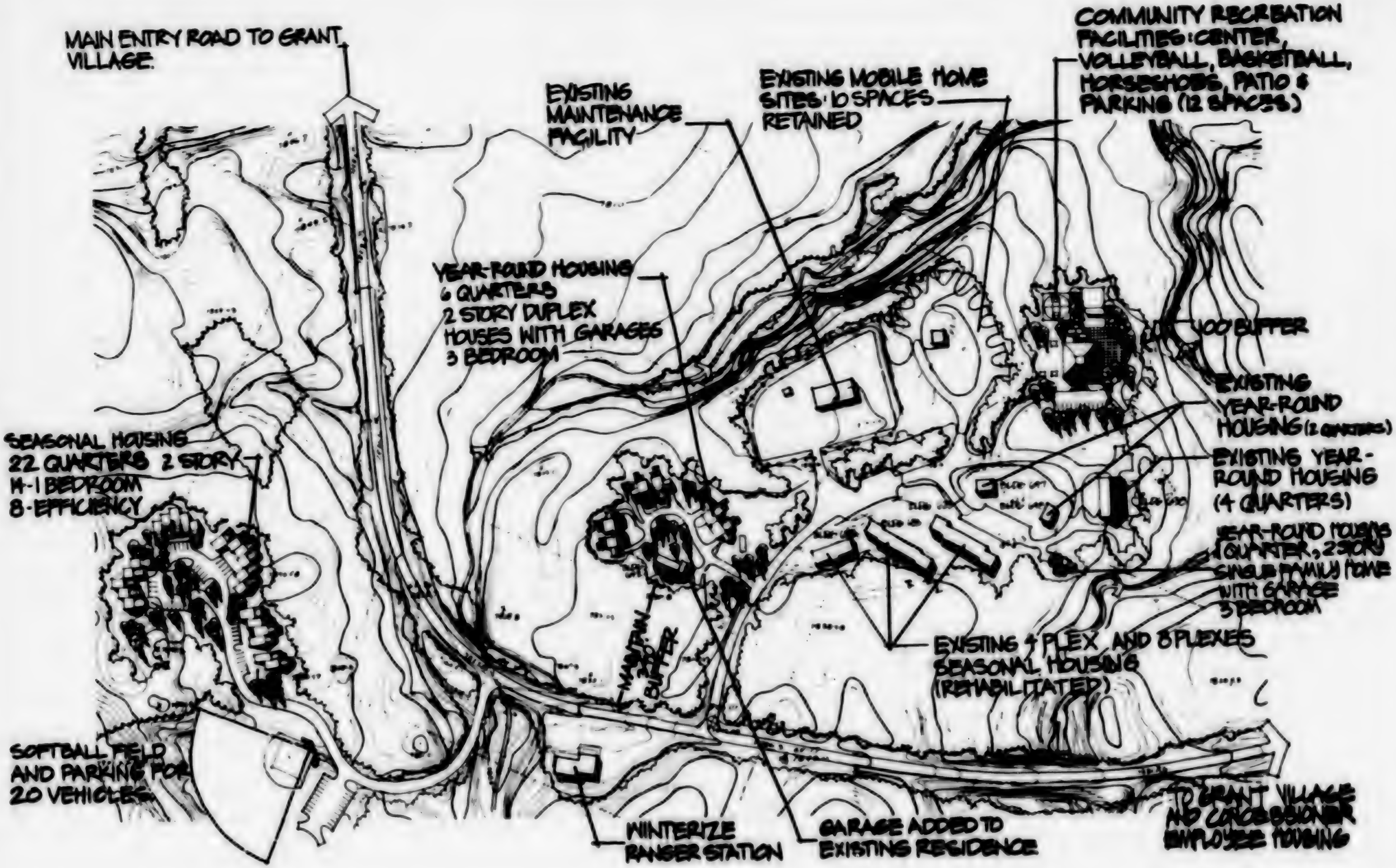
THE PROPOSAL

YELLOWSTONE NATIONAL PARK

Grant Village Park Employee Housing

101 / 40279 / May 92

93

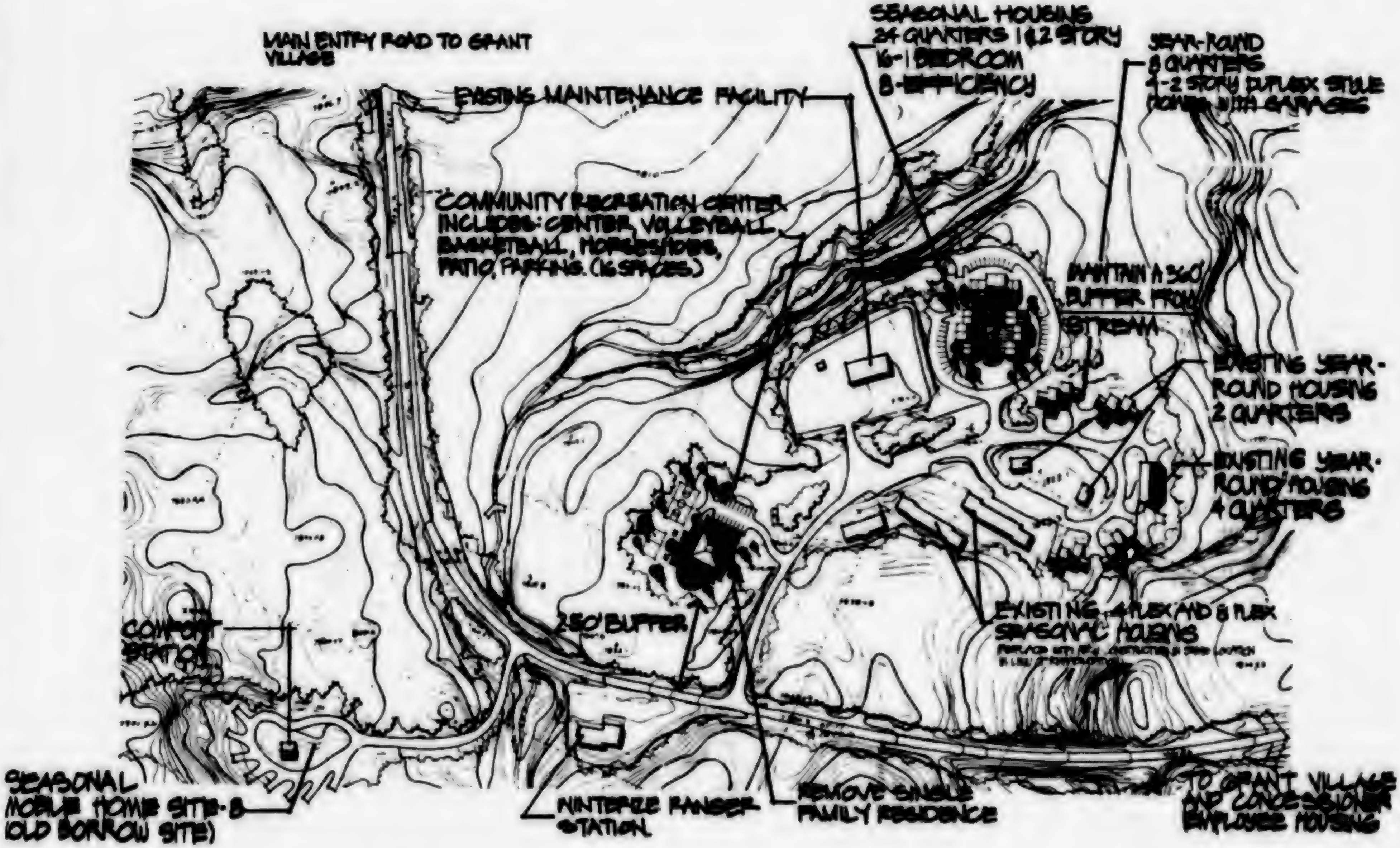

MAIN ENTRY ROAD TO GRANT VILLAGE
EXISTING MAINTENANCE FACILITY
EXISTING MOBILE HOME SITES: 10 SPACES RETAINED
COMMUNITY RECREATION FACILITIES: CENTER, VOLLEYBALL, BASKETBALL, HORSESHOES, PATIO & PARKING (12 SPACES)
YEAR-ROUND HOUSING 6 QUARTERS 2 STORY DUPLEX HOUSES WITH GARAGES 3 BEDROOM
100' BUFFER
EXISTING YEAR-ROUND HOUSING (2 QUARTERS)
EXISTING YEAR-ROUND HOUSING (4 QUARTERS)
YEAR-ROUND HOUSING (1 QUARTER, 2 STORY) SINGLE FAMILY HOME WITH GARAGE 3 BEDROOM
SEASONAL HOUSING 22 QUARTERS 2 STORY 14-1 BEDROOM 8-EFFICIENCY
MAXIMUM 30' BUFFER
EXISTING 4 PLEX AND 8 PLEXES SEASONAL HOUSING (REHABILITATED)
SOFTBALL FIELD AND PARKING FOR 20 VEHICLES
WINTERIZE RANGER STATION
GARAGE ADDED TO EXISTING RESIDENCE
TO GRANT VILLAGE AND CONCESSIONER EMPLOYEE HOUSING

ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

Grant Village Park Employee Housing

101 / 40280 / May 92


MAIN ENTRY ROAD TO GRANT VILLAGE
EXISTING MAINTENANCE FACILITY
SEASONAL HOUSING 24 QUARTERS 1 & 2 STORY 16-1 BEDROOM 8-EFFICIENCY
YEAR-ROUND 8 QUARTERS 1-2 STORY DUPLEX STYLE HOMES WITH GARAGES
COMMUNITY RECREATION CENTER INCLUDES: CENTER, VOLLEYBALL, BASKETBALL, HORSESHOES, PATIO, PARKING (16 SPACES)
MAINTAIN A 360' BUFFER FROM STREAM
EXISTING YEAR-ROUND HOUSING 2 QUARTERS
EXISTING YEAR-ROUND HOUSING 4 QUARTERS
EXISTING 4-PLEX AND 8-PLEX SEASONAL HOUSING
250' BUFFER
COMFORT STATION
SEASONAL MOBILE HOME SITE-8 (OLD BORROW SITE)
WINTERIZE RANGER STATION
REMOVE SINGLE FAMILY RESIDENCE
TO GRANT VILLAGE AND CONCESSIONER EMPLOYEE HOUSING

ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

Grant Village Park Employee Housing

101 / 40281 / May 92

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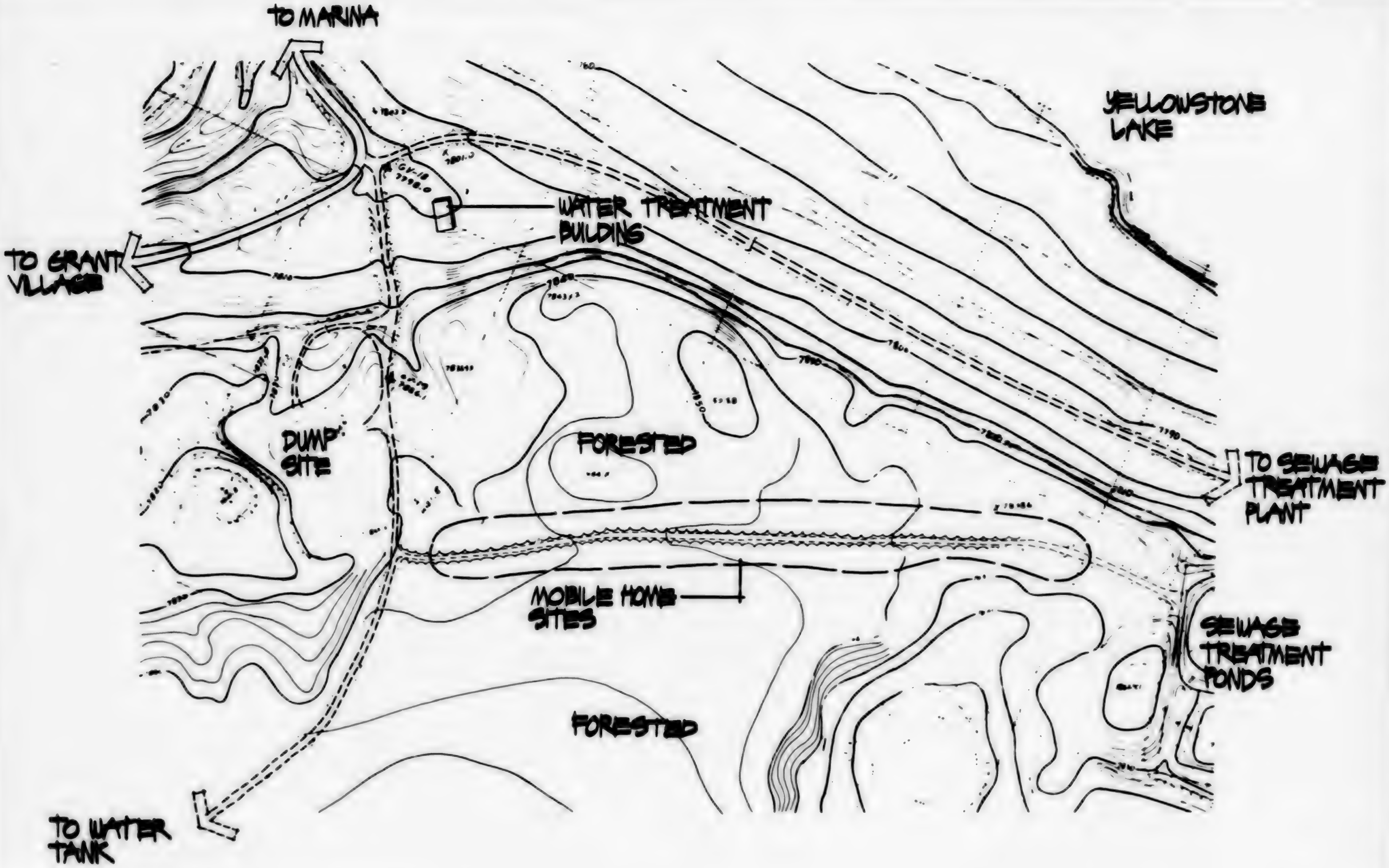
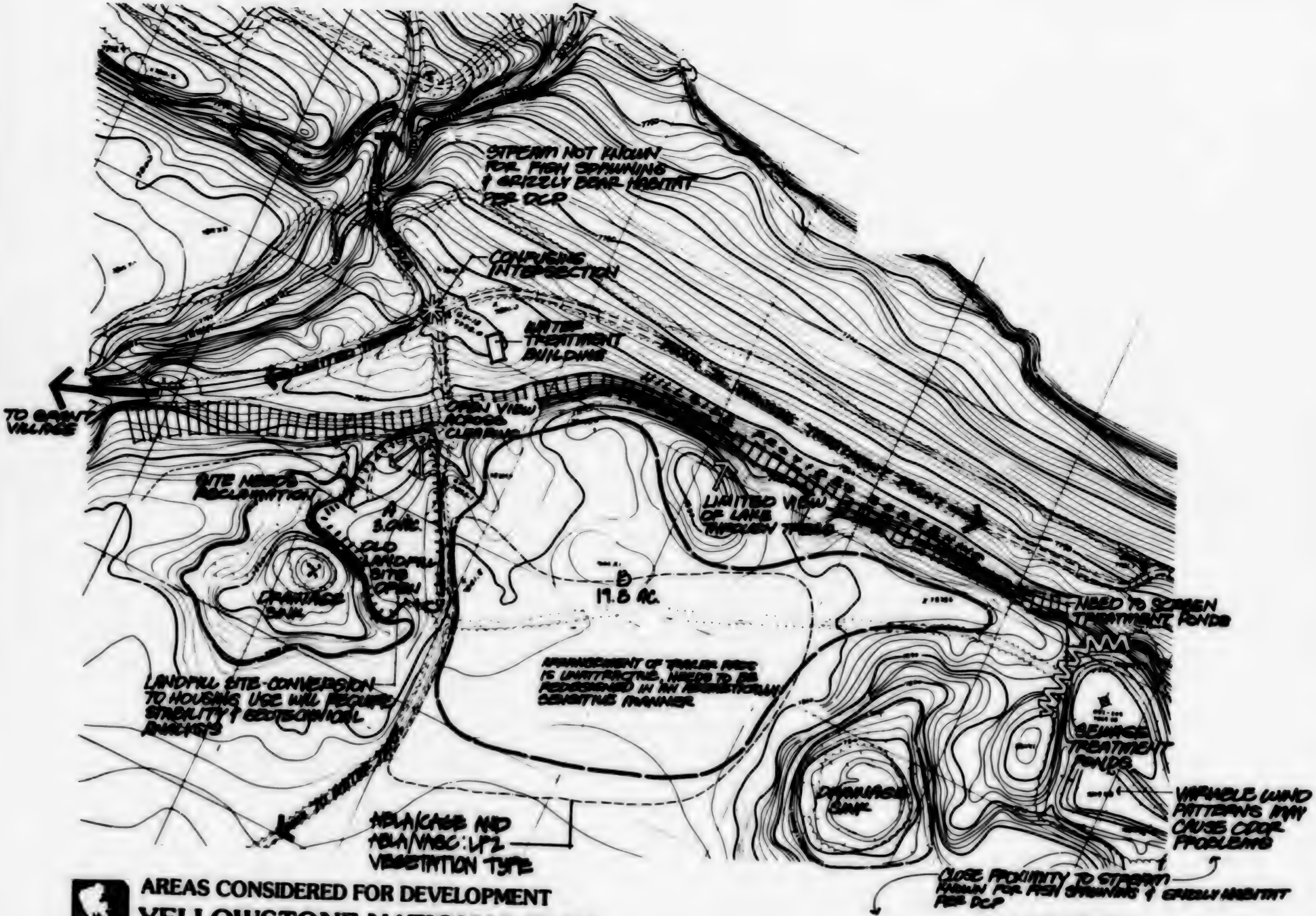


EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
Grant Village Concessioner Employee Housing

101 / 40282 / May 92

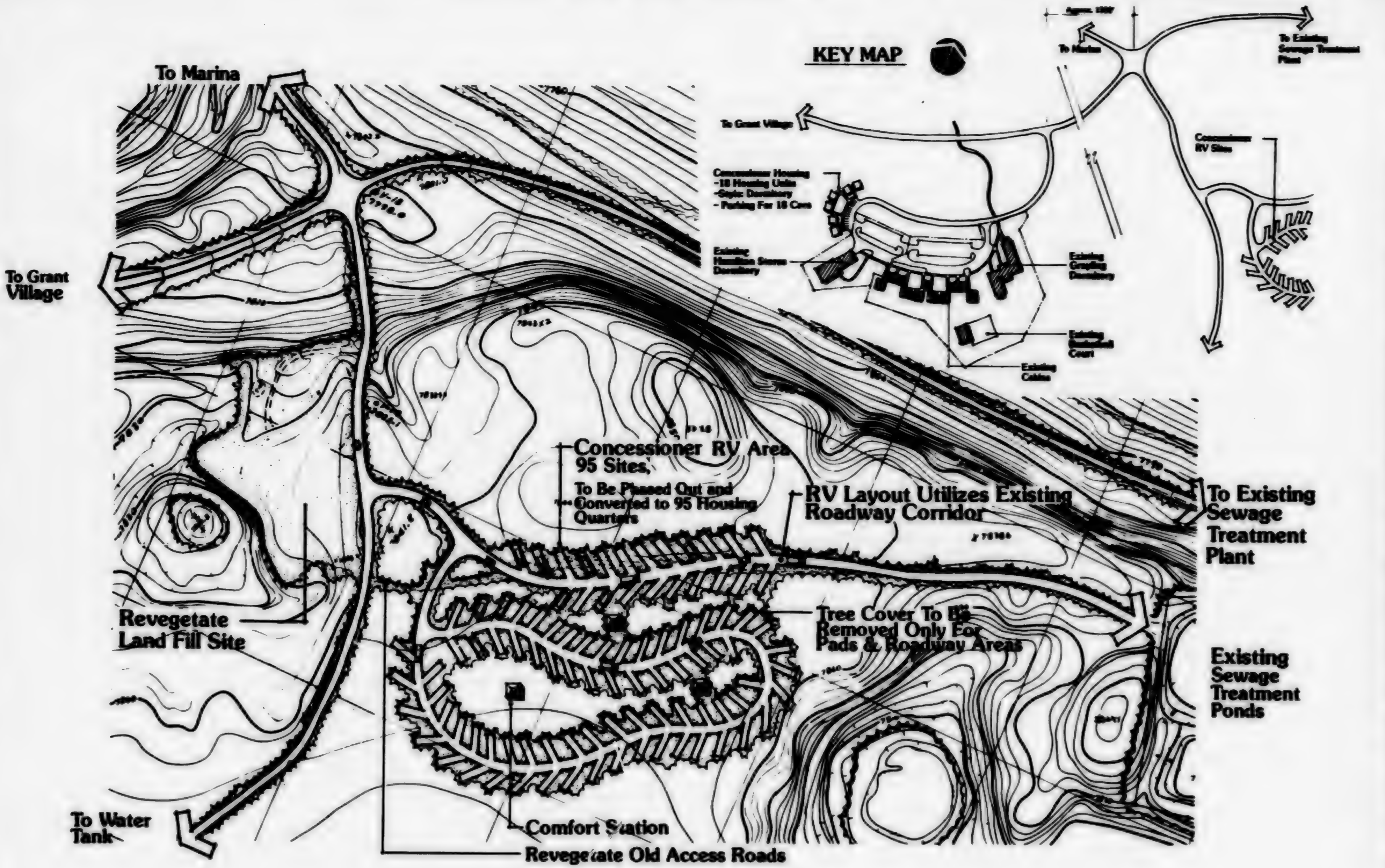

STREAM NOT KNOWN FOR FISH SPAWNING & GRIZZLY BEAR HABITAT PER DCP
CONFUSING INTERSECTION
WATER TREATMENT BUILDING
TO GRANT VILLAGE
OPEN VIEW ACROSS CLEARING
SITE NEEDS RECLAMATION
A 3.0 AC.
OLD LANDFILL SITE OPEN
DRAINAGE SINK
LIMITED VIEW OF LAKE THROUGH TREES
B 17.8 AC.
NEED TO SCREEN TREATMENT PONDS
ARRANGEMENT OF TRAILER PADS IS UNATTRACTIVE, NEEDS TO BE REDESIGNED IN AN AESTHETICALLY SENSITIVE MANNER
LANDFILL SITE-CONVERSION TO HOUSING USE WILL REQUIRE STABILITY & GEOTECHNICAL ANALYSIS
SEWAGE TREATMENT PONDS
DRAINAGE SINK
VARIABLE WIND PATTERNS MAY CAUSE ODOR PROBLEMS
HBLA/CAGE AND HBLA/VASC: LP2 VEGETATION TYPE
CLOSE PROXIMITY TO STREAM KNOWN FOR FISH SPAWNING & GRIZZLY HABITAT PER DCP

AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Grant Village Concessioner Employee Housing

101 / 40283 / May 92

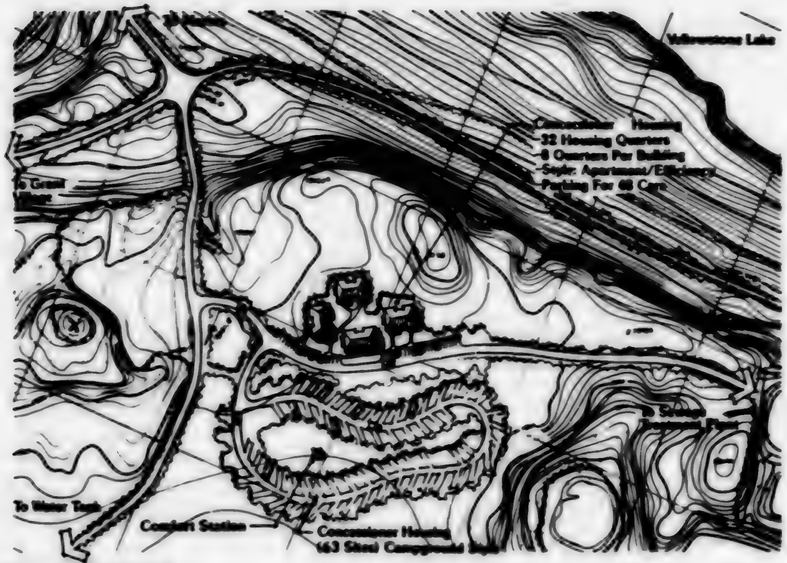

KEY MAP
To Marina
To Existing Sewage Treatment Plant
To Grant Village
Concessioner Housing
-18 Housing Units
-Style: Dormitory
- Parking For 18 Cars
Existing Hamilton Stores Dormitory
Existing Grayling Dormitory
Existing Basketball Court
Existing Cabins
Concessioner RV Sites
To Marina
To Grant Village
Concessioner RV Area
95 Sites,
To Be Phased Out and Converted to 95 Housing Quarters
RV Layout Utilizes Existing Roadway Corridor
To Existing Sewage Treatment Plant
Tree Cover To Be Removed Only For Pads & Roadway Areas
Existing Sewage Treatment Ponds
Revegetate Land Fill Site
To Water Tank
Comfort Station
Revegetate Old Access Roads
7760
7800
7790
7840

THE PROPOSAL
YELLOWSTONE NATIONAL PARK
Grant Village Concessioner Employee Housing

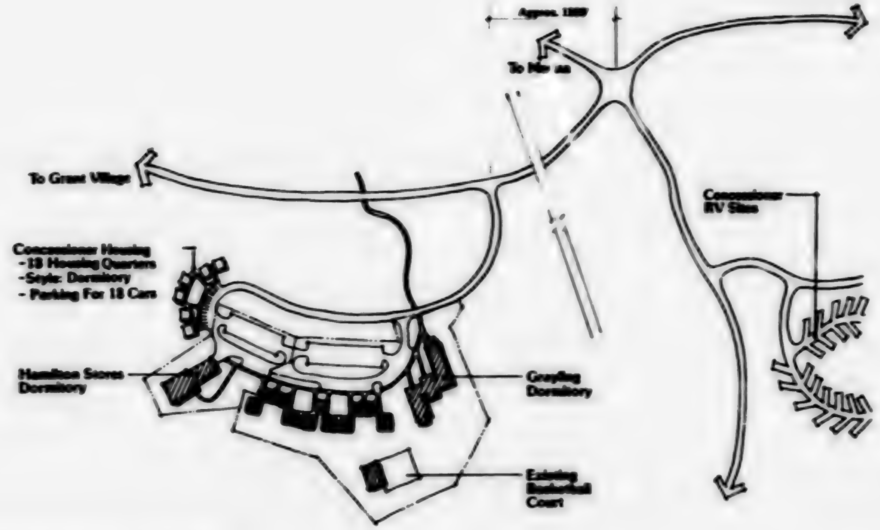
101 / 40284 / May 92

NORTH

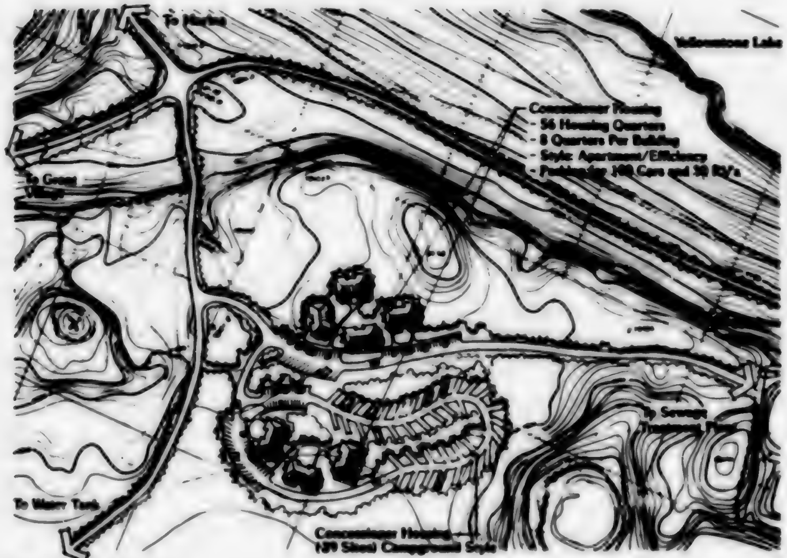
0 40' 80' 160' 240'



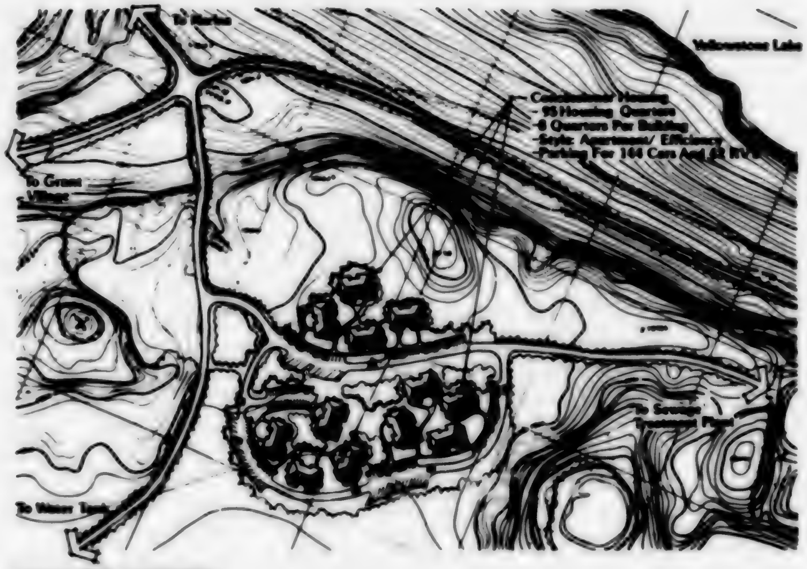
PHASE ONE



ADDITIONAL HOUSING
AT CONCESSION HOUSING AREA


To Marina
Yellowstone Lake
Concessioner Housing
- 56 Housing Quarters
- 8 Quarters Per Building
- Style: Apartment/Efficiency
- Parking for 100 Cars and 30 RV's
To Grant Village
To Sewage Treatment Plant
To Water Tank
Concessioner Housing
129 Sites Campground Style

PHASE TWO


To Marina
Yellowstone Lake
Concessioner Housing
- 95 Housing Quarters
- 8 Quarters Per Building
- Style: Apartment/ Efficiency
- Parking For 144 Cars And 62 RV's
To Grant Village
To Sewage Treatment Plant
To Water Tank

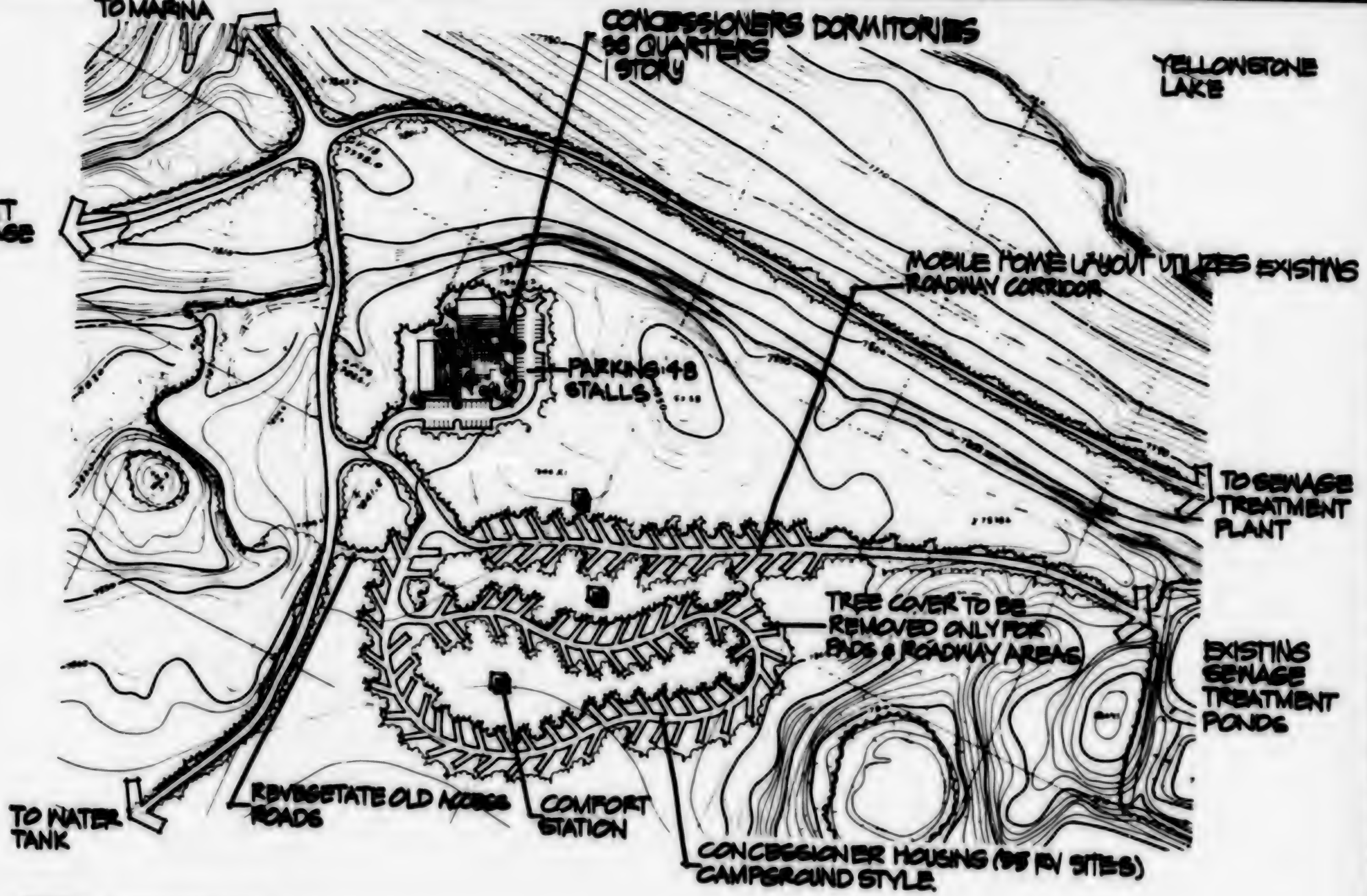
PHASE THREE

PHASING PLAN
YELLOWSTONE NATIONAL PARK
Grant Village Concessioner Employee Housing

99

101 / 40285 / May 92

NORTH


TO MARINA
CONCESSIONERS DORMITORIES
56 QUARTERS
1 STORY
YELLOWSTONE LAKE
GRANT VILLAGE
MOBILE HOME LAYOUT UTILIZES EXISTING ROADWAY CORRIDOR
PARKING 48 STALLS
TO SEWAGE TREATMENT PLANT
TREE COVER TO BE REMOVED ONLY FOR PADS & ROADWAY AREAS
EXISTING SEWAGE TREATMENT PONDS
TO WATER TANK
REVEGETATE OLD ACCESS ROADS
COMFORT STATION
CONCESSIONER HOUSING (95 RV SITES)
CAMPGROUND STYLE

ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

Grant Village Concessioner Employee Housing

101 / 40286 / May 92

MADISON JUNCTION

PURPOSE AND NEED

In 1878, Superintendent Philetus Norris began construction of a wagon road which would facilitate army travel through the park in the event of Indian hostilities. He was interested in providing an open route for travel from Fort Ellis near Bozeman, Montana, to Henry's Lake, Idaho, along the Virginia City route. This route resulted in the development of what has since become known as Madison Junction.

With the introduction of the automobile in 1915, a checking station and engineer's storehouse were built at Madison Junction. The Madison Museum was constructed in the 1930s to provide visitors with information on early exploration of the area and the creation of Yellowstone National Park. The Madison campground was built in 1929 and is located 14 miles from Old Faithful and 14 miles from the town of West Yellowstone. The elimination of the campground at Old Faithful during the Mission 66 program increased the importance of the Madison campground. Its location allows visitors to camp near the popular park features without harm to those fragile and scenic geyser basins.

Today, the Madison Junction area is the present-day National Park Service staging area for maintenance functions, resource and visitor protection and emergency services for the Madison Subdistrict. Employee housing for NPS employees associated with area operations is also provided here.

Employees who live within the Madison Junction area are affiliated with the NPS ranger, interpretation and maintenance divisions. The total number of employees working in this area averages 25, with approximately 5 being year-round and 20 being seasonal. While existing housing would accommodate all current year-round employees, only 14 seasonal employees can be accommodated here. The remaining five to six employees must commute to Madison Junction from West Yellowstone.

Staffing projections indicate that a total of 30 NPS employees would eventually be duty-stationed at Madison Junction. Housing would be provided for all employees in this area, with 9 housed year-round and 21 housed seasonally. In accordance with park policy, the 7 existing mobile homes would be removed and replaced with permanent structures. In addition, the seasonal housing in the existing eight-plex and in Building 419 is inadequate and should be replaced. The existing year-round residence, Building 123, is adequate and can be used in the future, given modest renovation and maintenance. No existing residences meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities.

The existing maintenance facilities are inadequate for storage and for housing necessary equipment. However, by expanding the depth of one existing bay in the maintenance facility, all equipment could be suitably protected. This area of expansion is currently occupied by the ranger offices; these offices would need to be accommodated elsewhere.

Sewer capacity for existing facilities in this area is inadequate. This system must be upgraded regardless of this proposal.

The existing structures located in the eastern end of the Madison Junction housing area are visible from the Grand Loop Road. Efforts would be made to minimize the visual impacts of the area, for both existing and proposed construction.

The Madison Junction area remains operational during the winter months, since a number of winter activities are staged throughout this area. In order to serve the needs of visitors and protect the resources of the park, ranger and maintenance services would need to be provided from winterized facilities at Madison Junction.

ALTERNATIVES

In the development of the community planning proposal for the Madison Junction area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the Madison Junction area were evaluated for their suitability to support employee housing and visitor support facilities. All of these areas had some constraints; Area "A" is somewhat visible from the main road and is adjacent to maintenance operations, Area "B" has some steeper slopes and is near maintenance operations, and Area "C" is visible from the Grand Loop Road. However, portions of each area can be developed if proper mitigation measures are utilized. In addition to these parameters, other site-specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required extensive new disturbance of ground, required construction in wetlands, or would have poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Madison Junction Area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Most employees who were housed in the area would continue to live in substandard seasonal and mobile homes. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Maintenance equipment could not be properly protected. Sewer capacity would continue to be inadequate. A number of structures would continue to be visible to visitors passing by on the Grand Loop Road. Employee housing, maintenance, and ranger facilities would not be properly winterized.

The Proposal

This plan addresses the community needs identified for the Madison Junction area through redevelopment of housing, maintenance and ranger facilities. Additional housing for NPS employees would be added, maintenance and operational concerns would be addressed, and the visitor experience would be improved. No existing structures are considered historic. Construction would occur primarily in disturbed areas.

Housing

Projected needs for park employee housing would be met with this plan. New two-story buildings housing 8 year-round quarters would be located where the mobile homes and the administrative building are currently sited. In addition, the existing ranger residence would be retained as one year-round quarters, for a total of 9 year-round quarters. New construction could be phased in to allow for use of the mobile homes for year-round personnel while new homes are being built. New construction and rehabilitation would meet NPS housing design standards.

Twenty-one seasonal quarters would be provided in new two-story buildings, located where the current eight-plex is sited. Phasing in of these units would require partial demolition of the existing eight-plex, construction of one new seasonal building, and then demolition of the remainder of the eight-plex. At the same time, several mobile homes would be retained prior to construction of the last of the year-round houses, for use by seasonal employees until the last new seasonal quarters are built.

All newly constructed units would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

Maintenance facilities would be improved by enlarging the western bay of the existing building.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be provided in the central area of the new year-round housing units.

Ranger and West District Offices

The existing offices would be relocated to make room for housing. New offices, suitable for winter use, would be constructed west of the existing maintenance building, requiring relocation of some outdoor recreational facilities. The ranger offices relocated from the maintenance building would be incorporated into these new offices.

Utilities

The existing wastewater facility would be expanded and upgraded to serve proposed development.

Visual Impacts

The new housing units and the new community center, which would be visible from both the Grand Loop Road and the Madison-West Entrance Road, would be screened with native vegetation.

Alternative One

This plan partially addresses the community needs identified for the Madison Junction area through redevelopment of housing facilities. Additional housing for NPS employees would be added and the visitor experience would be improved. However, maintenance and operational concerns would not be addressed. No existing structures are considered historic. The majority of new construction would occur in undisturbed areas.

Housing

The projected needs for park employee housing would be met with this plan. Four new two-story, year-round quarters would be located where the mobile homes are currently sited, and 4 new year-round quarters would be located to the west of the existing maintenance building; these quarters would be somewhat visible from the West Yellowstone-Madison road. In addition, the existing ranger residence would be retained as 1 year-round quarters, for a total of 9 year-round quarters. New construction would be phased in to allow for use of the mobile homes for year-round personnel while new homes are being built. New construction and rehabilitation would meet NPS housing design standards.

Twenty-one seasonal quarters would be provided in a combination of existing and newly constructed units. Seven new one-story quarters would be located south of the current eight-plex, in an area visible from the West Yellowstone-Madison road. The existing eight-plex and 6 seasonal quarters in the West District office building would be retained; rehabilitation of these units to meet NPS standards would be difficult. New construction could be phased in since the additional employees for this area would not be hired until the new seasonal quarters were built. All newly constructed units would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

Maintenance facilities would not be improved, leaving some maintenance equipment unprotected.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be provided south of the new cluster of four year-round housing units.

Ranger and West District Offices

The existing offices would remain; however, it would be difficult to upgrade and winterize these offices.

Utilities

The existing wastewater facility would be expanded and upgraded to serve proposed development.

Visual Impact

New housing units and the community center, which would be visible from both the Grand Loop Road and the Madison-West Entrance Road, would be screened with native vegetation.

Alternative Two

This plan partially addresses the community needs identified for the Madison Junction area through redevelopment of housing facilities. Additional housing for NPS employees would be added and the visitor experience would be improved.

However, maintenance and operational concerns would not be addressed. No existing structures are considered historic. The majority of new construction would occur in disturbed areas. However, some new disturbance would be required for the new seasonal quarters.

Housing

The projected needs for park employee housing would be met with this plan. Eight new two-story, year-round quarters would be located where the mobile homes are currently sited. In addition, the existing ranger residence would be retained as one year-round quarters, for a total of 9 year-round quarters. New construction could be phased in to allow for use of the mobile homes for year-round personnel while new homes are being built. New construction and rehabilitation would meet NPS housing design standards.

Twenty-one seasonal quarters would be provided in a combination of existing and newly constructed units. Seven new one-story quarters would be located west of the existing maintenance facility, in an area visible from the main road. The existing eight-plex and 6 seasonal quarters in the West District office building would be retained; rehabilitation of these units to meet NPS standards would be difficult. New construction could be phased in since the additional employees for this area would not be hired until the new seasonal quarters were built. All newly constructed units would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

Maintenance facilities would not be improved, leaving some maintenance equipment unprotected.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be centrally located in the new cluster of eight year-round housing units.

Ranger and West District Offices

The existing offices would remain; however, it would be difficult to upgrade and winterize these offices.

Utilities

The existing wastewater facility would be expanded and upgraded to serve proposed development.

Visual Impact New housing units and the community center, which would be visible from both the Grand Loop Road and the Madison-West Entrance Road, would be screened with native vegetation.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the Madison Junction area were formed on an alluvial fan derived from rhyolitic tuff bedrock. The average soil texture is sandy loam, with some loams and sandy clay loams. Gravels make up 30 percent of the soil. No larger rock fragments were observed. The soil surface is at least 12 inches thick with neutral pH. Depth to bedrock is greater than 5 feet. The area slopes 10 percent to the south. The soils are generally well-drained with moderate fertility.

The Madison Junction area is influenced by the Hebgen Lake and Gallatin faults. Seismic activity in this area has been monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 7.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences averaged 3.23 picocuries/liter. This suggests that the potential for radon contamination is moderate for this area.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 0.6 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas, and adjacent ground cover could increase, thereby reducing erosion potential.

Removing existing road segments, mobile homes, and scattered buildings and using native plant materials to return sites to more natural conditions would restore 0.5 acres of soil and vegetation.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

Alternative One
Construction would disturb 1.1 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two
Construction would disturb 0.5 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

The northwest slope above the Madison Junction area considered for housing development represents the ecotone between a dry, exposed, south-facing slope and a forested bottom. As such, it is classified as a forested/non-forested mosaic, specifically, PICO/CARU with an LP1 cover type and ARTR/AGSP. Plant species represented on-site include a poorly developed and sparse overstory of lodgepole pine interspersed with sulphur buckwheat, big sagebrush, Oregon grape, rosy pussytoes, silvery lupine, northern goldenrod, bluebunch wheatgrass, pinegrass, California brome, timothy, prairie junegrass, and Richardson's needlegrass.

A small spring surfaces on the slope behind the existing mobile home complex. Groundwater is channeled downslope for approximately 75 feet and returns underground. The local plant community in the area of the spring is dominated by the baltic rush, dagger-leaf rush, and the Nebraska sedge. Canada thistle and Kentucky bluegrass dominate the spring margin areas.

The seep area itself is a wetland, whereas the surrounding area is not. No sensitive, threatened, or endangered plant species were found in this area.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in continued deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 0.6 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

Removing existing road segments and scattered buildings and using native plant materials to return sites to more natural conditions would restore 0.5 acres of soil and vegetation.

Overall, impacts to vegetation would be minor in the short-term, but some deterioration of vegetation would occur over time in the developed area.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One

Construction would disturb 1.1 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two

Construction would disturb 0.5 acres. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

Large mammals found in the Madison Junction area include bison, moose, elk, deer, grizzly bear, and black bear. Smaller mammals include coyote, porcupine, red squirrel, Uinta ground squirrel, pine marten, weasel, mice, and voles.

Birds using this general area of the park include bald eagles, as well as typical forest and meadow dwellers such as woodpeckers, Clark's nutcracker, common raven, mountain chickadee, red-breasted nuthatch, mountain bluebird, yellow-rumped warbler, Western tanager, and sparrows.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include tiger salamander, boreal toad, and Western spotted frog and possibly the striped chorus frog. Reptile species include wandering and common garter snakes and possibly the rubber boa.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 0.6 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 1.1 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative Two would disturb approximately 0.5 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

The Madison Junction housing area is not in any 100- or 500-year floodplains or flash-flood hazard area.

A wetlands inventory of this area has been completed. The only area identified as wetlands is the small seep above the project area.

Environmental Consequences

No-Action Alternative

There would be no additional impacts to wetlands under this alternative.

The Proposal

The seep area would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that this wetlands could be directly or indirectly impacted.

Alternative One

The seep area would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that this wetlands could be directly or indirectly impacted.

Alternative Two

The seep area would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that this wetlands could be directly or indirectly impacted.

WATER QUALITY

Affected Environment

The condition of the Madison River, located approximately one-third mile from the project area, is considered nearly pristine. The Madison Junction area's water supply is taken from a series of spring collection systems. The system has a storage capacity of 100,000 gallons. The capacity of the system is sufficient for the project.

The Madison Junction wastewater treatment system is an old trickling filter plant. The effluent is pumped to two percolation ponds above the plant. A third, lined lagoon cell is used for winter storage of sewage. The plant has aerobic digester and sledge drying beds. The system is operating beyond the design capacity of the plant.

Environmental Consequences

No-Action Alternative

Continued operations at Madison Junction would result in potential surface and groundwater pollution in this area from road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program for replacing leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks would be replaced within the parameters of this program.

The wastewater treatment system would require replacement in the immediate future regardless of this proposal.

The Proposal

Any further development of the Madison area would require the expansion and upgrading of the existing wastewater treatment systems.

Construction activities would have minor impacts to surface and groundwater sources and adjacent wet meadow areas. Sources of impacts potentially include increased stream sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper attention to construction techniques, no significant impact to the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects on the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

FISHERIES

Affected Environment

The Madison River supports populations of rainbow and brown trout, mountain whitefish, sculpin, and minnow species.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Alternative One

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to fish populations would be similar to those described for the proposed action. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Madison Junction area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves, campfires, and motor vehicles are sometimes visible in the immediate area during temperature inversions.

There is no air quality monitoring equipment in the Madison area, and baseline data specific to this area is not available. The closest air quality monitoring station is to the southeast at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the northeast at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased impacts to air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes during construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects would not occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One would not occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two would not occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The Madison Junction housing and maintenance areas are currently visible from the Madison-West Entrance Road and from the Grand Loop Road. The surrounding forest and terrain features help reduce visibility to and from the roads in some areas. In addition, the housing and maintenance areas are directly adjacent to one another, with no screening between them.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The project would be visible from the Madison-West Entrance Road and from the Grand Loop Road. The proposed residences would be less visually obtrusive than some of the present mobile homes. The new units would be designed and finished in a manner compatible with park architectural themes.

Removal of the existing mobile homes would improve the aesthetic appearance of the area. Nighttime light pollution from the area would increase.

Alternative One
Impacts and enhancement to the visual quality of the area would be similar to the proposed action.

Alternative Two
Impacts and enhancement to the visual quality of the area would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in and adjacent to the Madison government housing area. This is a discrete area removed from the campground and the Madison Museum, a National Historic Landmark. There are no known cultural resources in the area proposed for development.

The area proposed for development has been intensively surveyed, in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, and no archeological sites were documented (Cannon 1991).

There are no historic structures in the Madison government housing area. The government housing area is not within view of the historic Madison Museum.

Environmental Consequences

For all alternatives, there are no known cultural resources that would be affected by the proposed development at the Madison Junction government housing area. The proposed work would have no impact on the Madison Museum, a National Historic Landmark. If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The primary visitor use in this area is a 292-site campground. The Madison Museum is located in the campground area. Madison Junction is the location of the confluence of the Gibbon and Firehole rivers which form the Madison River; all three rivers are major fishing attractions. The meadows surrounding the Madison Junction area are popular for viewing wildlife. During the winter months, a warming hut and restrooms are located at Madison.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact.

Environmental Consequences

No-Action Alternative

Under this alternative, the existing mobile homes would remain, lessening the visual quality of the visitor experience. Visitor services would be limited to those provided by the current number of NPS staff. Staffing for visitor services during the winter would remain limited. Visitor services could be adversely affected due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, construction noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. The visual quality of the developed area would be improved and more employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE OPERATIONS

Affected Environment

The National Park Service administers their visitor services, protection, and emergency services for the Madison Subdistrict, as well as the maintenance operations for the entire West District, from this area. Madison Junction is strategically located to provide acceptable response time to emergency situations north, west and south of the area. The NPS operates a 292-site campground, the Madison Museum, a ranger station, a warming hut in the winter, maintenance facilities, and water and sewage treatment facilities at Madison Junction. NPS employee quarters consist of 1 single-family residence, 2 apartment buildings, a dormitory, and 6 mobile homes. The quarters are located in the government housing area across the road from the campground. During peak season, the NPS employs an average of 25 employees at Madison Junction.

Environmental Consequences

No-Action Alternative

This alternative would have no immediate adverse impacts on the NPS operations in the Madison Junction area. However, if housing needs are not met in the long term, the result would be further overcrowding and employee dissatisfaction. This could create an adverse impact on the government's hiring ability and, therefore, on their operations.

The Proposal

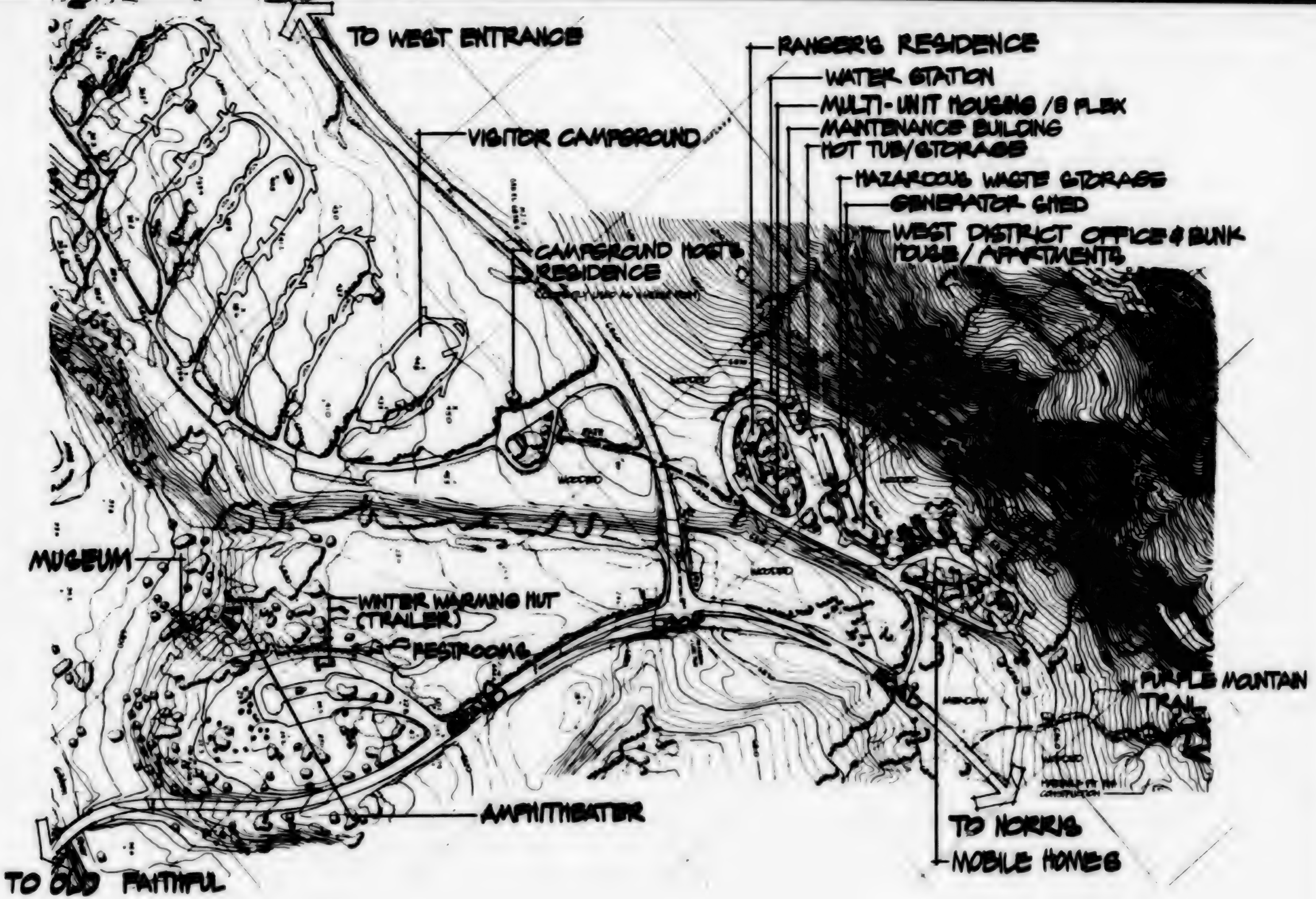
The proposal meets the NPS program requirements for housing. Constructing new housing units for NPS employees would improve employee morale by providing better housing with increased privacy and additional living and storage space and by alleviating overcrowding. Recreation and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents and visitors during the construction phase. This would be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

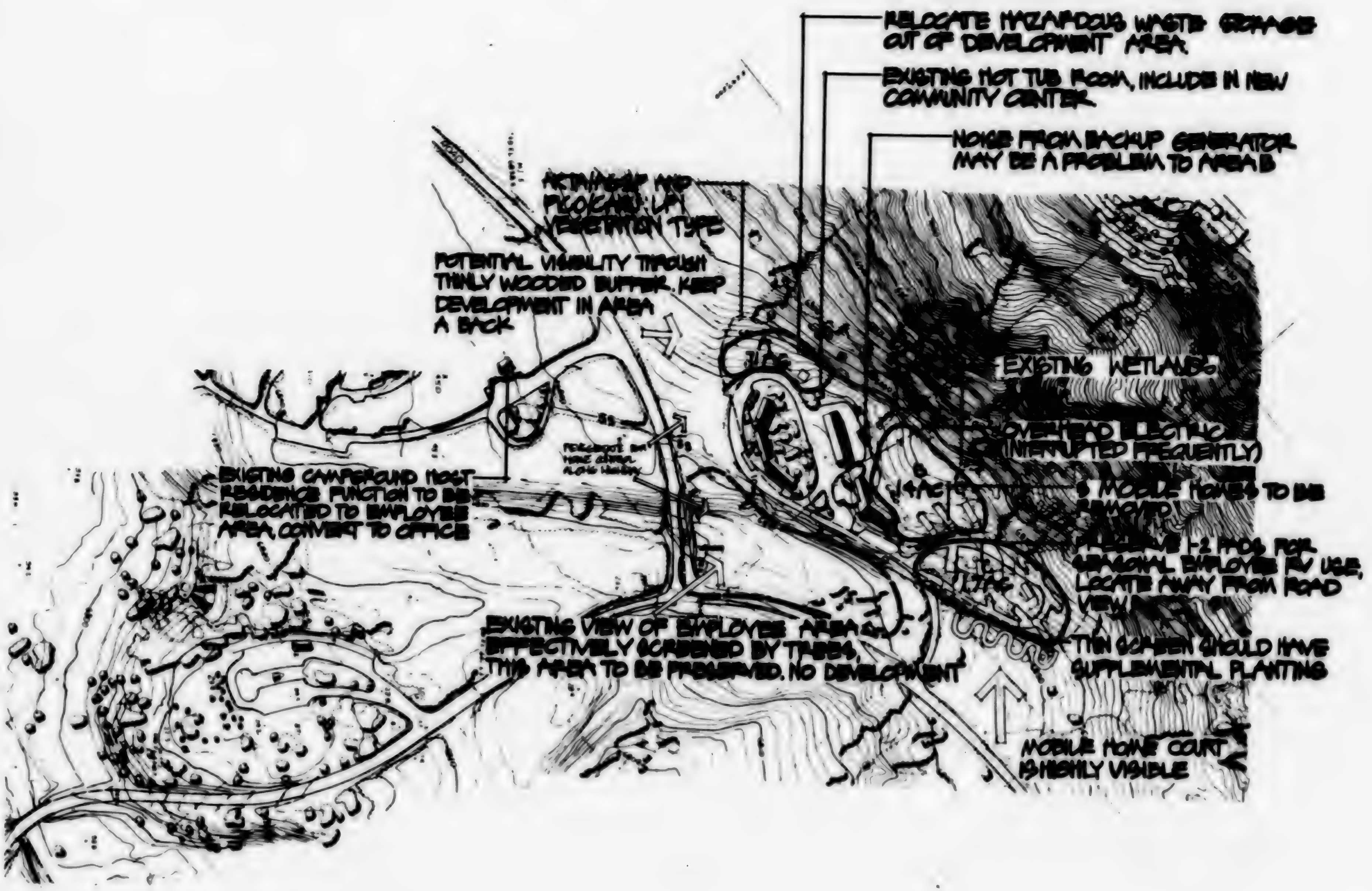
The effects of Alternative Two would be the same as those described under the Proposal.



EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
Madison Junction Park Employee Housing

101 / 40287 / May 92

NORTH

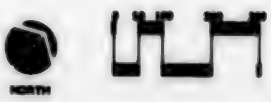

RELOCATE HAZARDOUS WASTE STORAGE OUT OF DEVELOPMENT AREA.
EXISTING HOT TUB ROOM, INCLUDE IN NEW COMMUNITY CENTER.
NOISE FROM BACKUP GENERATOR MAY BE A PROBLEM TO AREA B
ARTEMISIA AND PICO/CARU: LP1 VEGETATION TYPE
POTENTIAL VISIBILITY THROUGH THINLY WOODED BUFFER. KEEP DEVELOPMENT IN AREA A BACK
EXISTING WETLANDS
OVERHEAD ELECTRIC (INTERRUPTED FREQUENTLY)
B
4 AC
8 MOBILE HOMES TO BE REMOVED
C
1.7 AC
PROVIDE 1-2 PADS FOR SEASONAL EMPLOYEE RV USE, LOCATE AWAY FROM ROAD VIEW
EXISTING CAMPGROUND HOST RESIDENCE FUNCTION TO BE RELOCATED TO EMPLOYEE AREA, CONVERT TO OFFICE
EXISTING VIEW OF EMPLOYEE AREA & EFFECTIVELY SCREENED BY TREES. THIS AREA TO BE PRESERVED. NO DEVELOPMENT
THIN SCREEN SHOULD HAVE SUPPLEMENTAL PLANTING
MOBILE HOME COURT IS HIGHLY VISIBLE

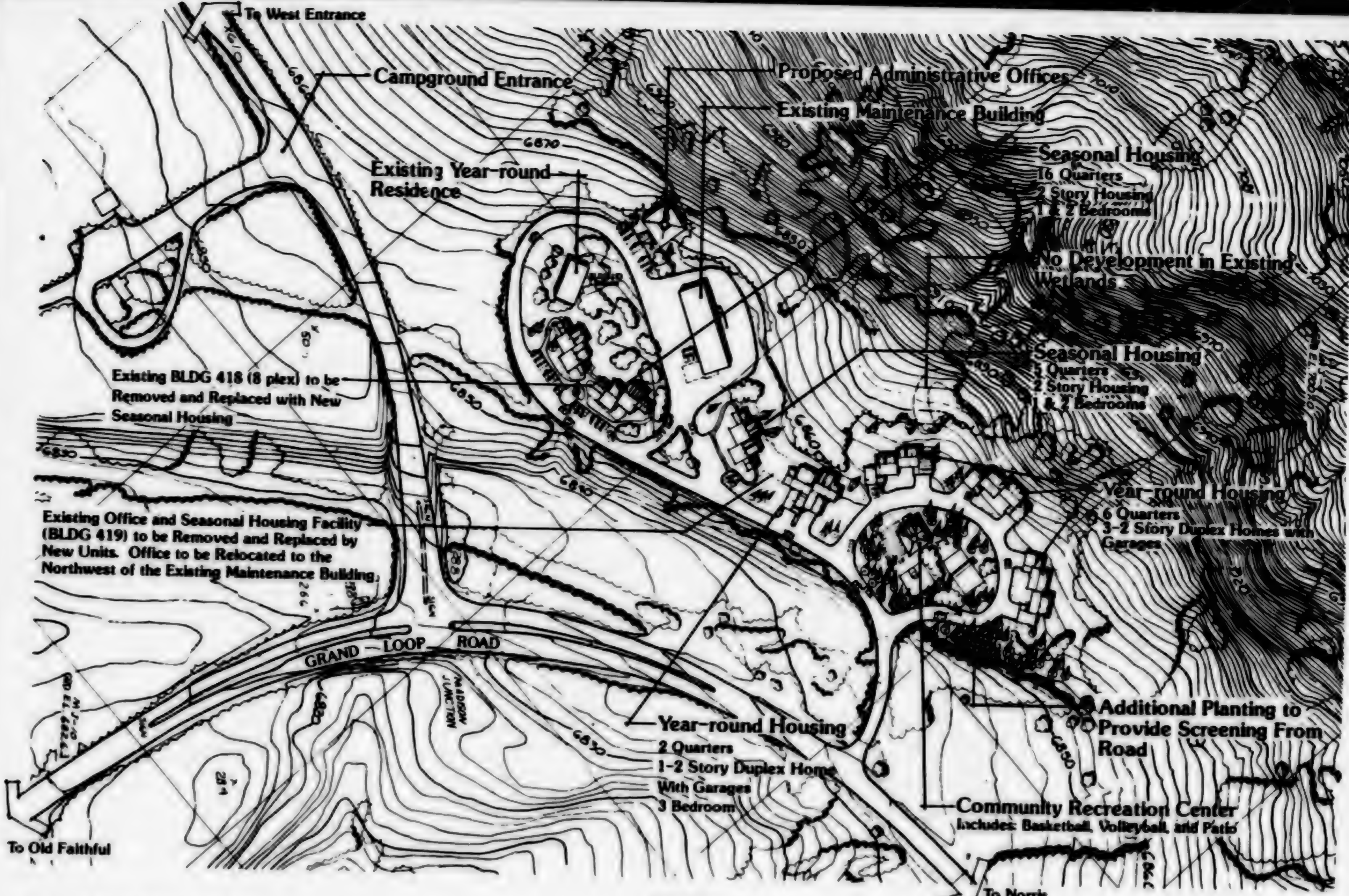
AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Madison Junction Park Employee Housing

101 / 40288 / May 92




To West Entrance
Campground Entrance
Proposed Administrative Offices
Existing Maintenance Building
Seasonal Housing
16 Quarters
2 Story Housing
1 & 2 Bedrooms
Existing Year-round Residence
No Development in Existing Wetlands
Seasonal Housing
5 Quarters
2 Story Housing
1 & 2 Bedrooms
Existing BLDG 418 (8 plex) to be Removed and Replaced with New Seasonal Housing
Year-round Housing
6 Quarters
3-2 Story Duplex Homes with Garages
Existing Office and Seasonal Housing Facility (BLDG 419) to be Removed and Replaced by New Units. Office to be Relocated to the Northwest of the Existing Maintenance Building.
GRAND LOOP ROAD
MADISON JUNCTION
Year-round Housing
2 Quarters
1-2 Story Duplex Home With Garages
3 Bedroom
Additional Planting to Provide Screening From Road
Community Recreation Center
Includes: Basketball, Volleyball, and Patio
To Old Faithful
To Norris
6830
6870
6850
6810
6820
6860
7010
7000

Program Summary

Retain 1 Year-round Quarter
Retain 0 Seasonal Quarters
Construct 8 Year-round Quarters
Construct 21 Seasonal Quarters

THE PROPOSAL

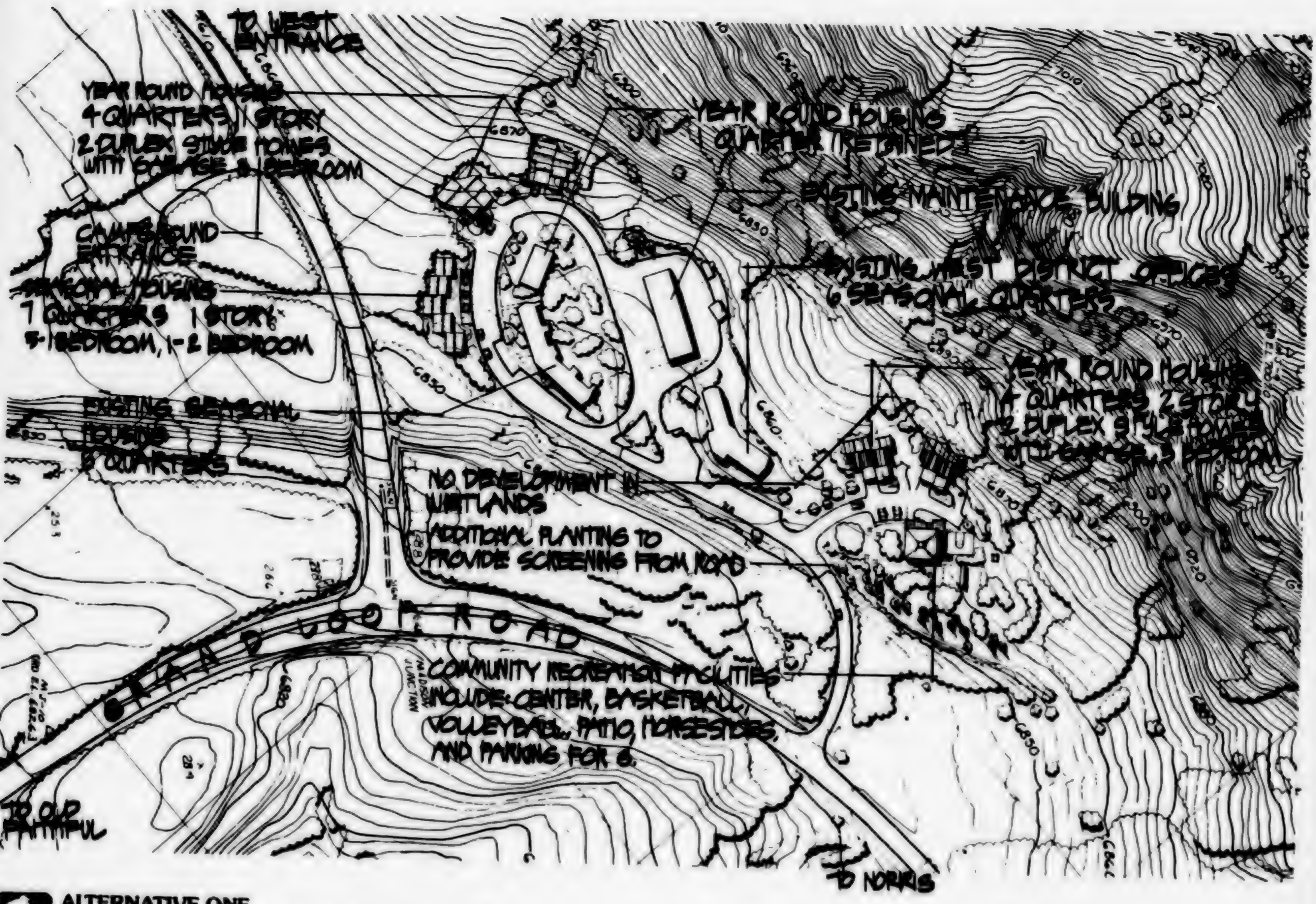
YELLOWSTONE NATIONAL PARK

Madison Junction Park Employee Housing

101 / 40289 / May 92

NORTH

122

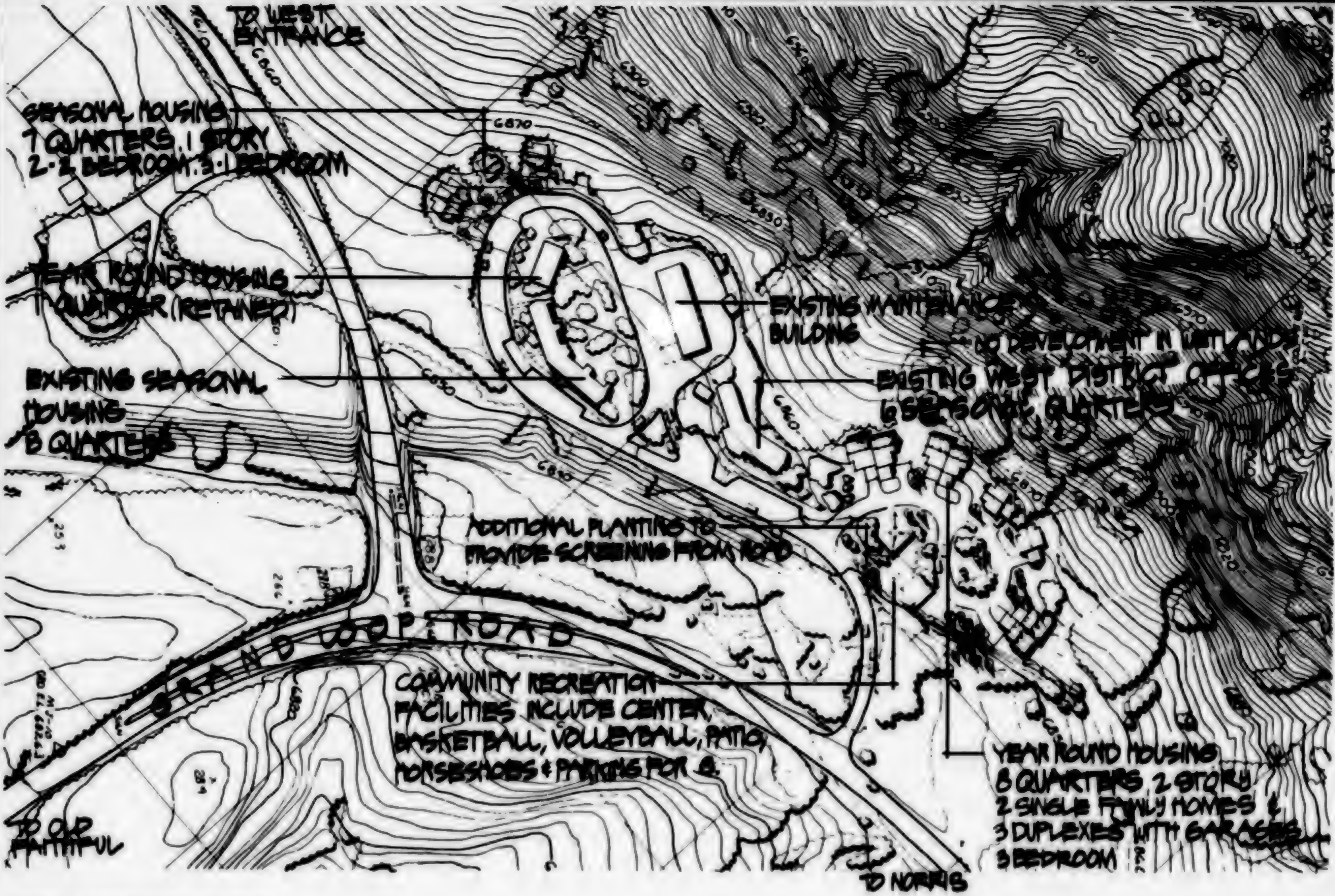

TO WEST ENTRANCE
YEAR ROUND HOUSING 4 QUARTERS, 1 STORY 2 DUPLEX STYLE HOMES WITH GARAGE 3 BEDROOM
YEAR ROUND HOUSING QUARTERS RETAINED
EXISTING MAINTENANCE BUILDING
CAMPGROUND ENTRANCE
SEASONAL HOUSING 7 QUARTERS 1 STORY 6-1 BEDROOM, 1-2 BEDROOM
EXISTING WEST DISTRICT OFFICES 6 SEASONAL QUARTERS
YEAR ROUND HOUSING 4 QUARTERS 2 STORY 2 DUPLEX STYLE HOMES WITH GARAGE, 3 BEDROOM
EXISTING SEASONAL HOUSING 8 QUARTERS
NO DEVELOPMENT IN WETLANDS
ADDITIONAL PLANTING TO PROVIDE SCREENING FROM ROAD
GRAND LOOP ROAD
MADISON JUNCTION
COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, BASKETBALL, VOLLEYBALL, PATIO, HORSESHOES, AND PARKING FOR 6.
TO OLD FAITHFUL
TO NORRIS

ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

Madison Junction Park Employee Housing

101 / 40290 / May 92


TO WEST ENTRANCE
SEASONAL HOUSING 7 QUARTERS, 1 STORY 2-2 BEDROOM, 3-1 BEDROOM
YEAR ROUND HOUSING 1 QUARTER (RETAINED)
EXISTING SEASONAL HOUSING 8 QUARTERS
EXISTING MAINTENANCE BUILDING
NO DEVELOPMENT IN WETLANDS
EXISTING WEST DISTRICT OFFICES & SEASONAL QUARTERS
ADDITIONAL PLANTING TO PROVIDE SCREENING FROM ROAD
GRAND LOOP ROAD
COMMUNITY RECREATION FACILITIES INCLUDE CENTER, BASKETBALL, VOLLEYBALL, PATIO, HORSESHOES & PARKING FOR 6.
YEAR ROUND HOUSING 8 QUARTERS, 2 STORY 2 SINGLE FAMILY HOMES & 3 DUPLEXES WITH GARAGES 3 BEDROOM
TO OLD FAITHFUL
TO NORRIS
6870
6860
6850
6880

ALTERNATIVE TWO
YELLOWSTONE NATIONAL PARK
Madison Junction Park Employee Housing

101 / 40291 / May 92

NORRIS JUNCTION

PURPOSE AND NEED

In the early years, Norris Junction was not a primary visitor destination. But, because it is situated conveniently along the route south to Old Faithful and the route east to Canyon, it served as a perfect lunch site for travelers who had departed by stage from Canyon or Mammoth in the morning. In the 1890s, Larry's Lunch Station (named for the proprietor) was built here. In 1886, the Yellowstone Association opened the doors to the Norris Hotel and, despite several fires, the hotel was in operation until 1916. Norris Junction was one of the sites for a soldier station (1886) which continued to be used as a ranger station until the building was damaged by the 1959 earthquake.

In the 1930s, the Norris Visitor Center and accompanying employee quarters were constructed in a style which was to become synonymous with traditional park architecture. The quarters provide for on-site protection for the fragile geyser basin as well as visitor accessibility to a ranger. Additional facilities were constructed in the 1930s away from the geyser basin to accommodate the increasing staffing and maintenance demands for this area. Today, Norris is a primary destination during the summer months and a popular point of interest during the winter season.

The Norris Junction area is the present-day National Park Service staging area for maintenance, interpretive functions, and emergency services for the western portion of the Canyon Subdistrict. This area also provides housing for employees associated with area operations.

Employees who live within the Norris Junction area are affiliated with the NPS ranger, interpretive, and maintenance divisions. The total number of employees working in this area averages 12, with approximately 3 being year-round and 9 being seasonal. While most employees can be accommodated (in substandard housing) within this area during the summer, none of the year-round employees can be housed here during the winter. The year-round employees must commute to Norris Junction from Gardiner, Canyon, or Mammoth Hot Springs during the winter.

Staffing projections indicate that a total of 19 NPS employees would eventually be duty-stationed at Norris Junction. Housing would be provided for all employees in this area, with 4 housed year-round and 15 housed seasonally. In accordance with park policy, the 2 existing mobile homes and 1 transa-home would be removed and replaced with permanent structures. Other residential structures in the area are in acceptable condition and can be used in the future, given modest renovation and maintenance. No existing residences meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities.

Maintenance functions currently operate from a building that is located in an area which is periodically flooded. This facility should be moved to prevent future problems. Certain ranger activities occur within a small portion of this maintenance building. A new building is needed to meet these additional needs.

Structures in the housing area are somewhat visible from the campground which is located to the north across a broad meadow. Any new structures should maintain the current visual buffer and should be finished in muted colors and materials in order to further reduce visibility of this area.

Existing water supply and wastewater treatment systems do not meet capacity, health, or safety requirements. These systems would be upgraded to meet those requirements.

During the winter months, only vault toilets are provided in the Norris Junction area. However, a warming hut is proposed for this area, as is a year-round ranger and maintenance facility. In order to serve the needs of visitors and to protect the resources of the park at this time of the year, ranger and maintenance services would need to be provided from winterized facilities at Norris Junction.

ALTERNATIVES

In the development of the community planning proposal for the Norris Junction area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the Norris Junction area were evaluated for their suitability to support employee housing and visitor support facilities. Of the three areas investigated, all three were determined to have some constraints; Area "A" is somewhat visible from the Grand Loop Road, and Areas "B" and "C" are forested. However, no other viable sites exist in this area. Therefore, mitigation of impacts must be provided where necessary. In addition to these general parameters, other site- specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required construction in flood-prone, wetland, or utility areas, would not have retained historic structures, or would have poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Norris Junction area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Some employees who were housed in the area would continue to live in substandard mobile homes. Handicapped accessible housing would not be available. No community recreation facilities or common gathering area would exist. Maintenance and ranger facilities would be subject to periodic flooding, would be inadequately sized for projected needs, and would not be winterized. Water supply and wastewater treatment facilities would need to be expanded and upgraded.

The Proposal

This plan addresses the community needs identified for the Norris Junction area through development of several new areas, while retaining historic buildings. Additional housing for NPS employees would be added and maintenance and operational concerns would be addressed. The majority of new construction would occur within forested areas.

Housing

Projected needs for park employee housing would be met with this plan. Three new two-story, year-round quarters would be located in the forested area south of the existing year-round residence (which will be rehabilitated and retained). All construction and rehabilitation would meet NPS housing design standards.

Fifteen seasonal quarters would be provided in a combination of existing and newly constructed units. Twelve employees would be housed in new one-story units located in a forested area west of the new year-round units. Phasing in of these units can be achieved by constructing some of the new buildings and deferring hiring of new seasonal employees until construction is completed. In addition, the two existing buildings which house four seasonal employees would be rehabilitated and retained for use by three seasonal employees.

The majority of residential traffic can be separated from maintenance traffic with the new road.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance A new maintenance building would be constructed in an area to the south of the existing facility, out of flood-prone areas on forested ground. The existing facility would be retained for storage purposes.

Recreational Facilities A small community center with associated outdoor recreation facilities would be provided in the area south of the existing seasonal quarters. Existing wet areas would be avoided.

Ranger Facilities Ranger facilities would be incorporated into the new maintenance facility.

Utilities Water and waste water treatment facilities would need to be expanded and upgraded, regardless of this proposed development.

Alternative One

This plan partially addresses the community needs identified for the Norris Junction area through development of several new areas, while retaining historic buildings. Additional housing for NPS employees would be added. Maintenance and operational concerns would not be addressed. Some new construction would occur in forested areas.

Housing Projected needs for park employee housing would be met with this plan. Three new two-story, year-round quarters would be located south of the existing seasonal residences (which would be rehabilitated and retained). Year-round and seasonal quarters would be intermingled with this plan. New construction and rehabilitation would meet NPS housing design standards.

Fifteen seasonal quarters would be provided in a combination of existing and newly constructed units. Twelve employees would be housed in new one-story units located in a forested area south of the existing year-round unit. Phasing in of these units could be achieved by constructing some of the new buildings, then deferring hiring of new seasonal employees until construction was completed. In addition, the two existing buildings which house four seasonal employees would be rehabilitated and retained for use by three seasonal employees.

Residential traffic would be mixed with maintenance traffic.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

The existing structures would remain in their current location and condition. They would continue to be subject to periodic flooding. No increase in building area, to support projected future needs, could be accommodated.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be provided in a previously disturbed area between the existing year-round quarters and the new seasonal quarters.

Ranger Facilities

Ranger facilities would remain in their current location. They would continue to be subject to periodic flooding. It would be difficult to winterize this building.

Utilities

Water supply and wastewater treatment facilities would need to be expanded and upgraded, regardless of this proposed development.

Alternative Two

This plan partially addresses the community needs identified for the Norris Junction area through development of several new areas, while retaining historic buildings. Additional housing for NPS employees would be added. Maintenance and operational concerns would not be addressed. Some new construction would occur in forested areas.

Housing

Projected needs for park employee housing would be met with this plan. Three new two-story, year-round quarters would be located south of the existing year-round residence (which would be rehabilitated and retained). Year-round and seasonal quarters would be intermingled with this plan. New construction and rehabilitation would meet NPS housing design standards.

Fifteen seasonal quarters would be provided in a combination of existing and newly constructed units. Twelve employees would be housed in new one-story units located in a forested area south of the new year-round units. Phasing in of these units could be achieved by constructing all of the new seasonal employee buildings while housing any new year-round employees elsewhere until the seasonal housing was completed. In addition, the two existing buildings which house four seasonal employees would be rehabilitated and retained for use by three seasonal employees.

Residential traffic would be mixed with maintenance traffic.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance The existing structures would remain in their current location and condition. They would continue to be subject to periodic flooding. No increase in building area, to support projected future needs, could be accommodated.

Recreational Facilities No community center or outdoor recreational facilities would be provided.

Ranger Facilities Ranger facilities would remain in their current location. They would continue to be subject to periodic flooding. It would be difficult to winterize this building.

Utilities Water and wastewater treatment facilities would need to be expanded and upgraded, regardless of this proposed development.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

The majority of the soils in the general area are formed from glacial till derived from rhyolitic tuff bedrock. However, some of the level areas are formed from alluvial deposits of sands and gravels. The average soil texture is loam at the surface with subsoil of sandy loam. There are some lenses of clay loam and very fine sandy loam textured soils. Gravels make up approximately 20 to 25 percent of the soil profile. The surface soil is 1 to 3 inches thick and depth to bedrock is more than 5 feet. Slopes in the area range from 0 to 8 percent. These soils are well drained. A portion of the area has soils that are higher in clay, lower in sand, and lower in gravels. This area has poorer drainage.

The proposed construction would occur approximately one-third of a mile from the Norris Geyser Basin. Because no sub-surface structures are planned, disturbance to hydrothermal features is not anticipated.

The Norris Geyser Basin is at the intersection of three major fault zones; it is in the most seismically active area of the park, possibly in the entire Intermountain Seismic Belt, which extends from northern Montana to southern Utah (Trimball and Smith 1975). Seismic activity in this area has been monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 7.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences ranged from 0.3 to 0.9 picocuries/liter. This suggests that the radon contamination potential in the area is low.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in accelerated deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative will result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 2.5 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

Alternative One

Construction would disturb 1.3 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would still be necessary under Alternative One.

Alternative Two

Construction would disturb 1.2 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would still be necessary under Alternative Two.

VEGETATION

Affected Environment

Three different vegetation complexes are found within the area considered for future development. A mesic depression fed by a thermal runoff channel exists in the northeast portion of the area and is enclosed within the housing loop road. The site was classified as an ABLA/CACA habitat type with an LP1 cover type. The overstory is a young, even-aged stand of lodgepole pine. A sedge (*Carex sp.*) dominates the ground cover within the depression, while the margin is dominated by baltic rush, tufted hairgrass, and bluejoint reedgrass. The site has both hydrophytic vegetation and hydric soils, and is therefore classified as a wetland. A similar sedge dominated marsh exists on the southeast flank of the proposed development area.

Also along the southeast flank of the development area is a vegetation complex described as an ABLA/CACA habitat type with an LP2 cover type. A varied age class of lodgepole pine dominates the overstory, whereas lodgepole pine, whitebark pine, and subalpine fir dominate the understory. The herbaceous layer is primarily composed of bluejoint reedgrass, pinegrass, grouse whortleberry, dwarf bilberry, alpine wintergreen, wild strawberry, and northern goldenrod. Although many mesic plant species are present, no hydric soil conditions exist. This type does not meet criteria for wetlands classification.

The remaining vegetation matrix in the area is classified as a PICO/CAGE habitat type with an LP2 cover type. The overstory is exclusively lodgepole pine, with a sparse understory of lodgepole pine and whitebark pine. The herbaceous stratum is similarly depauperate and is dominated by the shrubs grouse whortleberry and kinnickinnick; by the forbs wild strawberry, heart-leafed arnica, and white-flowered hawkweed; and by the graminoids elk sedge and Wheeler's bluegrass. Neither hydrophytic vegetation nor hydric soils exist; therefore, this type is not characteristic of wetlands.

No sensitive, threatened, or endangered plant species were found in the area.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in continued deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 2.5 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short- term, but some deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One
Under Alternative One, construction would disturb 1.3 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two
Under Alternative Two, construction would disturb 1.2 acres. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

The residential area is inhabited by elk, bison, and coyote, as well as smaller mammals such as porcupine, red squirrel, pine marten, weasel, mice, and voles. Grizzly bear, black bear, and moose may be present in the vicinity but are not usually seen in the residential area. Birds using this general area of the park are typical forest and meadow dwellers such as sparrows, warblers, sharp-shinned hawks, gray jays, ravens, great gray owls, and sandhill cranes.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include western spotted frog and possibly the tiger salamander, boreal toad, and striped chorus frog. Reptile species include the wandering garter snake and possibly the rubber boa and Northern sagebrush lizard.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence would continue to temporarily displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 2.5 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, and elk. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, and elk. Alternative One would remove approximately 1.3 acres of undeveloped wildlife habitat. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, and elk. Alternative Two would remove approximately 1.2 acres of undeveloped wildlife habitat. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

The Norris Junction housing area is not in any 100- or 500-year floodplains or flash flood hazard areas. However, some areas are subject to periodic inundation.

A wetlands inventory of this area has been completed. Sedge-dominated marshes exist in two locations adjacent to the proposed project areas. Construction would not occur in areas identified as wetlands.

Environmental Consequences

No-Action Alternative

There would be no additional impacts to wetlands under this alternative. Maintenance facilities would continue to be periodically flooded.

The Proposal

Maintenance facilities would be relocated out of areas of periodic flooding. Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative One

Maintenance facilities would continue to be periodically flooded. Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative Two

Maintenance facilities would continue to be periodically flooded. Wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near wetlands could increase the potential that wetlands could be directly or indirectly impacted.

WATER QUALITY

Affected Environment

The housing area lies approximately 300 feet from the Gibbon River. Domestic water is pumped from wells near the Gibbon River to a storage tank approximately two miles from the housing area. The water is treated with chlorine and is piped to the housing area via gravity flow. Replacement of this system is necessary.

The wastewater for the housing area is treated using a "North Dakota Mound" septic-leaching system. The treatment mound lies just south of the proposed construction area. Currently, the wastewater treatment system is at capacity, is leaking, and needs to be replaced.

Environmental Consequences

No-Action Alternative

The proximity of the developed area to the Gibbon River and the local high water table suggest the potential for surface water contamination since the septic system exceeds capacity. Continued operations at Norris Junction would result in potential sources of surface and groundwater pollution in this area including stream degradation from road maintenance; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program for replacing leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The Norris Junction water and wastewater treatment systems will require replacement in the immediate future, regardless of this proposal.

The Proposal

The capacity of the Norris Junction domestic water supply would not be sufficient for all proposed development. A source of water with greater capacity would need to be developed. Any further development of the Norris area would require the expansion and upgrading of the existing wastewater systems.

Construction activities would result in minor impacts to surface and groundwater sources and wet meadow areas. Sources of impacts potentially include increased stream sedimentation from road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. All development would be located away from the Gibbon River. Given proper attention to construction techniques, no significant impact to the water quality of the area would occur. Overall construction impacts would be minor and would not result in any long-term effects on the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action. Overall construction impacts would be minor and would not result in any effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. Overall construction impacts would be minor and would not result in any effects on the area's water resources.

FISHERIES

Affected Environment

The Gibbon River supports populations of rainbow, brown and brook trout.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impact to the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Alternative One

Impacts to fisheries would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to fisheries would be similar to those described for the proposed action. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Norris Junction area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves, campfires and motor vehicles are sometimes visible in the immediate area during temperature inversions.

The National Park Service operates an asphalt batch plant at Norris Junction during the summer season. A smoke plume is visible from the area, and generated odors are evident during periods of operation. The NPS is in the process of filing for a permit with the state of Wyoming for continued operation of this batch plant.

There is no air quality monitoring equipment in the Norris area and baseline data specific to this area is not available. The closest air quality monitoring station is to the southeast at Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the northeast at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes from construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One are not expected to occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The project area is somewhat visible from the Grand Loop Road through two existing utility corridors. In addition, the site is partially visible from portions of the Norris campground and Norris picnic area.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The proposed residences would be less visually obtrusive than the existing mobile homes. The units would be designed and finished in a manner compatible with park architectural themes. Visual impacts from the proposed construction would be minor. However, nighttime light pollution from the area would increase.

Alternative One
Impacts to the visual quality would be similar to the proposed action.

Alternative Two
Impacts to the visual quality would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in an area adjacent to the Norris housing/maintenance area. The project area is bordered by the residential area on the west and north and the Gibbon River on the northeast. This is a discrete area that is removed from the Norris Geyser Basin and the campground. While a number of cultural resources exist in the Norris area, few have the potential to be affected by the project.

Intensive archeological surveys, which met the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, have located prehistoric and historic sites in the Norris area. A survey conducted by the National Park Service, in conjunction with Montana State University, recorded five prehistoric sites (Taylor et al. 1964). A prehistoric site (48YE402) was documented in 1988; it is one of the sites recorded by Taylor (Johnson and Lippencott 1989). The historic archeological component of 48YE402 was also documented in 1988 (Ayres 1989). Site 48YE14, in the Norris campground, was tested in 1991 and found to have one meter of deposits. Lithic scatter, historic dump deposits, and structural remnants are some of the cultural components found in the various sites. A few of the sites have both prehistoric and historic components. None of the sites have been evaluated for eligibility to the National Register; a formal determination of eligibility to the National Register, in consultation with the Wyoming State Historic Preservation Office, is still needed. None of the sites would be affected by the proposed project.

Recent intensive archeological inventories (Smith 1991; Cannon 1991) have found no archeological sites in the Norris housing area or in the adjacent area that is proposed for development.

There are seven historic buildings in the Norris area. These include the Norris Museum (# 115, a National Historic Landmark); the comfort station associated with the museum (# 116, listed on the National Register); the Norris Soldier Station, now Ranger Museum (# 111, eligible for listing on the National

Register); the Norris winterkeeper's residence (# 2273, eligible for listing on the National Register); the messhouse/quarters (# 112, ineligible for listing on the National Register); a bunkhouse (# 113, ineligible for listing on the National Register); and a bunkhouse/storage building (# 114, ineligible for listing on the National Register).

Environmental Consequences

If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

Of the four significant historic structures in the Norris area, only one has the potential to be affected (directly or indirectly) by the proposed development. This building is the Norris winterkeeper's residence. Because the Norris winterkeeper's residence is within view of the project area, the new structures would need to be designed to harmonize with the historic character of the winterkeeper's residence. The National Park Service would ensure that the design of any new construction would meet the Secretary of the Interior Standards for Rehabilitation.

Screening by the surrounding lodgepole pines would effectively shield the area of new development from the historic Norris Soldier Station. The Norris Museum and comfort station located in the Norris Geyser Basin are not within visual range of the new development.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The primary visitor attraction in the Norris area is an extensive geyser basin. Visitors follow paved trails and boardwalks through the thermal area, viewing geysers and other thermal features, either independently or guided by an interpretive ranger. A National Park Service museum is located in the geyser basin area and serves as an information and interpretive center. A 116-site NPS campground is located approximately 1/2-mile north of the geyser area. The campground area is a popular location for viewing wildlife. The recently rehabilitated Norris Soldier Station is located in the campground area and now serves as the Ranger Museum.

During winter months, the Norris Geyser Basin is an attraction to visitors travelling on oversnow vehicles. Restrooms are available to visitors.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact. This issue is addressed in the "Visual Quality" section for Norris.

Environmental Consequences

No-Action Alternative

Under this alternative, visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services would be adversely affected, due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. More employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE OPERATIONS

Affected Environment

The National Park Service administers their maintenance operations, visitor services, interpretation, protection, and emergency services for the western half of the Canyon Subdistrict from this area. Norris Junction is strategically located to provide acceptable response time to emergency situations north, east, and south of the area. The NPS operates a 116-site campground, two museums, a ranger station, maintenance facilities, and water and sewage treatment facilities at Norris Junction. NPS employee quarters consist of 3 residences, a transa-home, and 2 trailers. The quarters are located in the government housing area approximately one-half mile northeast of the geyser basin. During peak season, the NPS employs an average of 12 employees at Norris Junction.

Environmental Consequences

No-Action Alternative

This alternative would have no immediate adverse impacts on the NPS operations in the Norris Junction area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could create an adverse impact on the National Park Service's hiring ability and therefore on their operations.

The Proposal

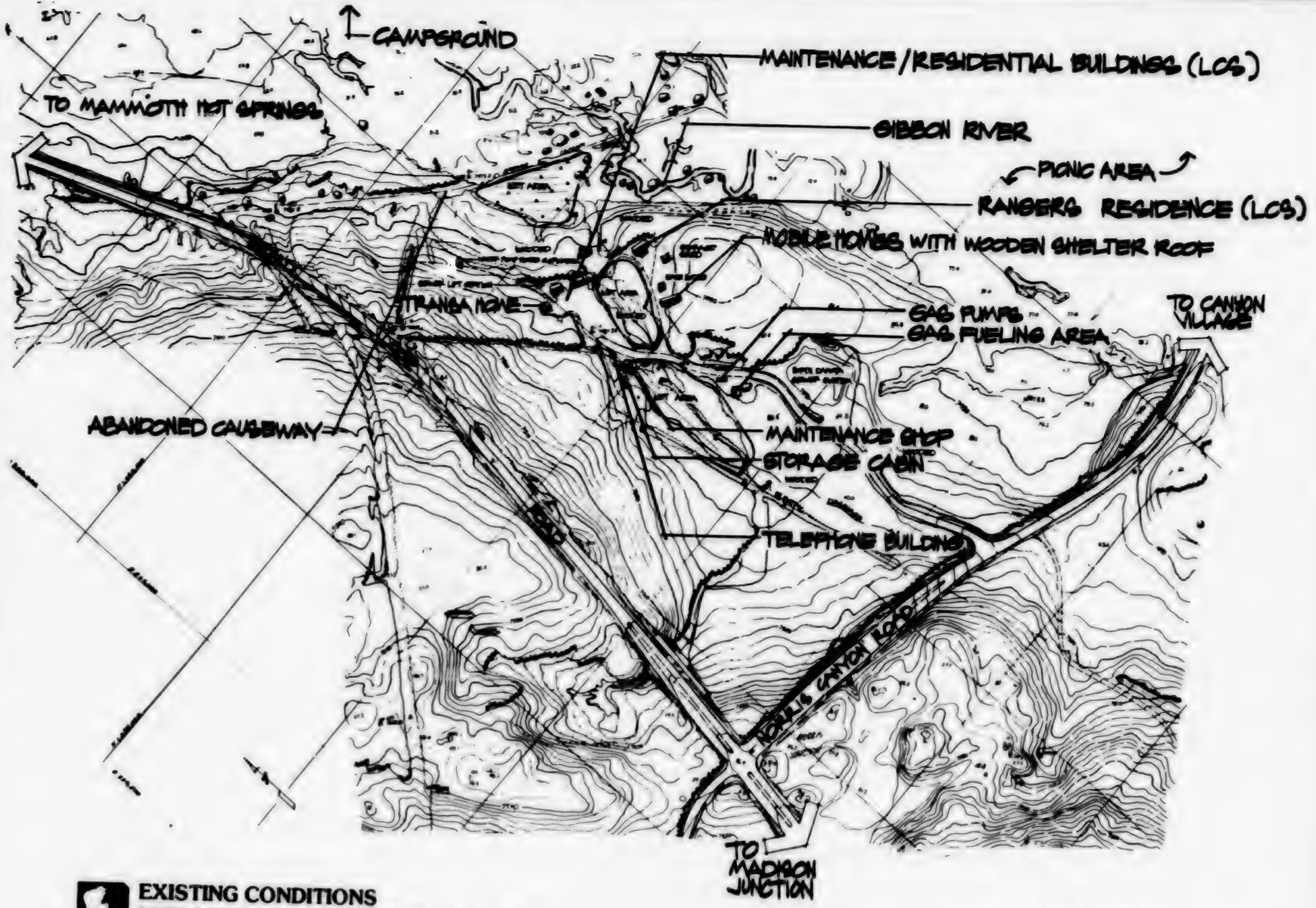
The proposal meets the NPS program requirements for housing. Constructing new housing units for NPS employees would improve employee morale by providing better housing with increased privacy, additional living and storage space, and by alleviating overcrowding. Recreation and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents and visitors during the construction phase. This would be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

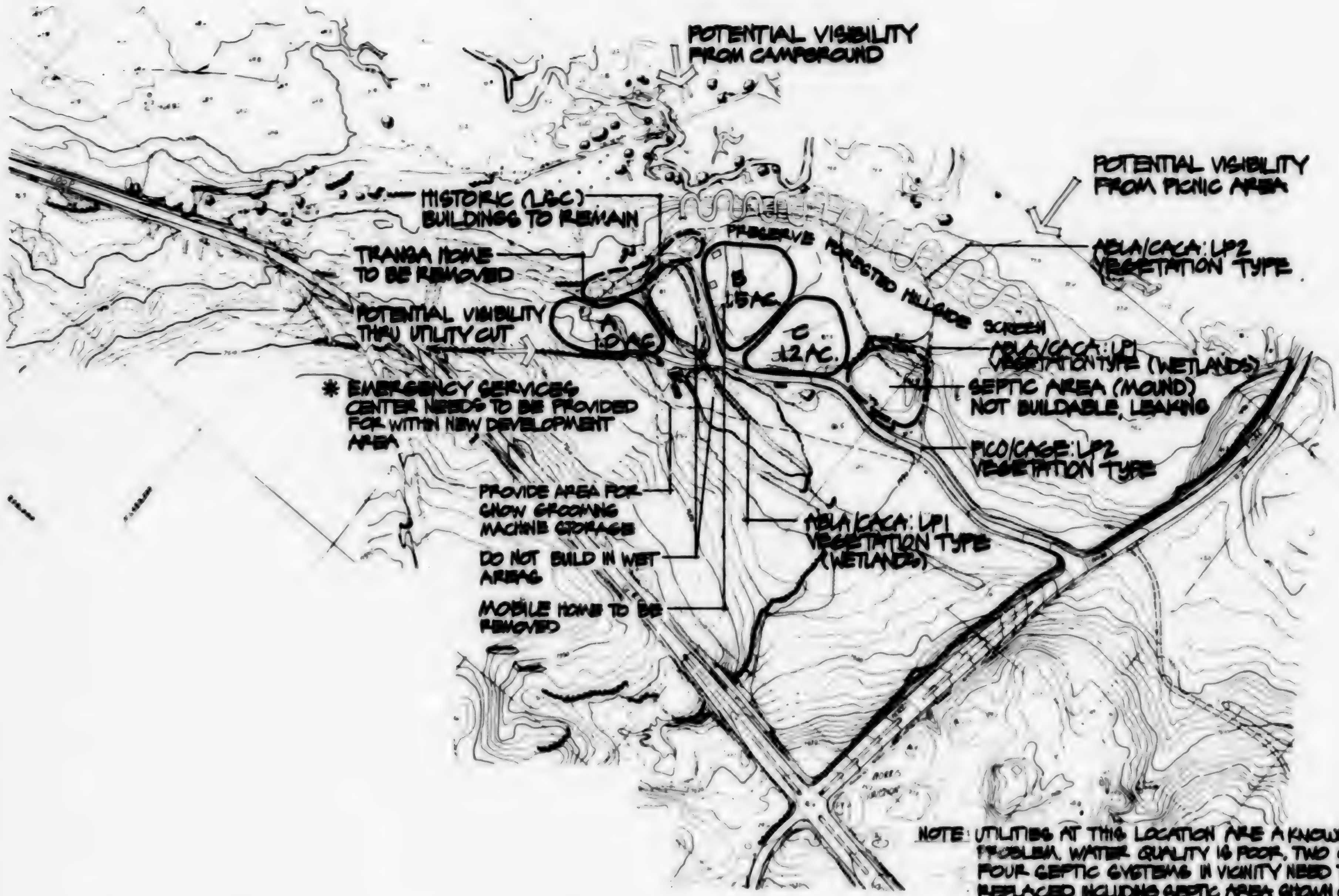
Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.



EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
Norris Park Employee Housing

101 / 40292 / May 92


POTENTIAL VISIBILITY FROM CAMPGROUND
POTENTIAL VISIBILITY FROM PICNIC AREA
HISTORIC (LGC) BUILDINGS TO REMAIN
TRANSA HOME TO BE REMOVED
POTENTIAL VISIBILITY THRU UTILITY CUT
PRESERVE FORESTED HILLSIDE SCREEN
ABLA/CACA: LP2 VEGETATION TYPE
A 1.0 AC.
B 1.5 AC.
C 1.2 AC.
ABLA/CACA: LP1 VEGETATION TYPE (WETLANDS)
SEPTIC AREA (MOUND) NOT BUILDABLE, LEAKING
PICO/CAGE: LP2 VEGETATION TYPE
* EMERGENCY SERVICES CENTER NEEDS TO BE PROVIDED FOR WITHIN NEW DEVELOPMENT AREA
PROVIDE AREA FOR SNOW GROOMING MACHINE STORAGE
DO NOT BUILD IN WET AREAS
MOBILE HOME TO BE REMOVED
ABLA/CACA: LP1 VEGETATION TYPE (WETLANDS)

NOTE: UTILITIES AT THIS LOCATION ARE A KNOWN PROBLEM. WATER QUALITY IS POOR. TWO OF FOUR SEPTIC SYSTEMS IN VICINITY NEED TO BE REPLACED, INCLUDING SEPTIC AREA SHOWN ON THIS PLAN. NO STAND BY POWER IS CURRENTLY PROVIDED.

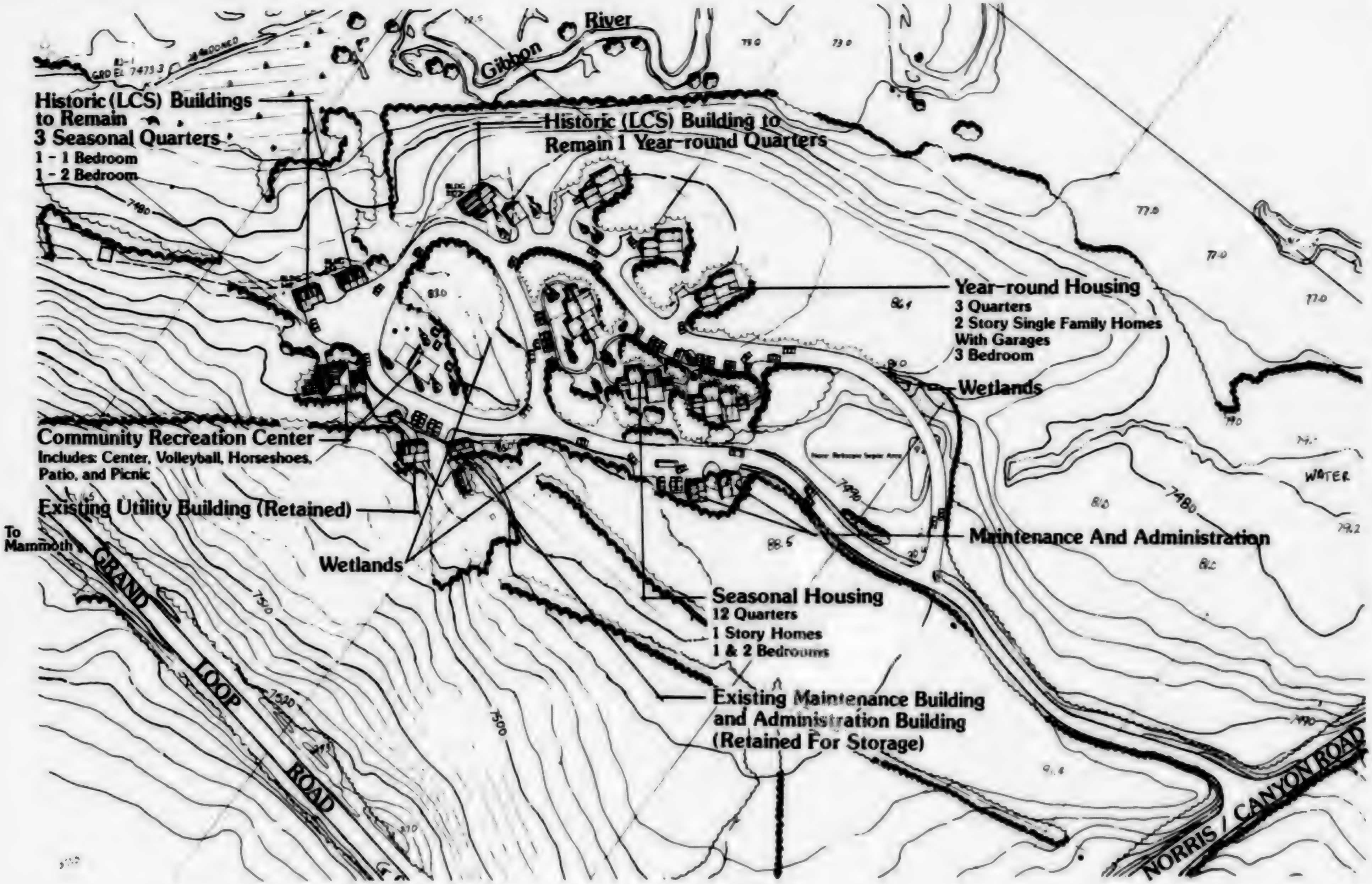
AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Norris Park Employee Housing

101 / 40293 / May 92

NORTH

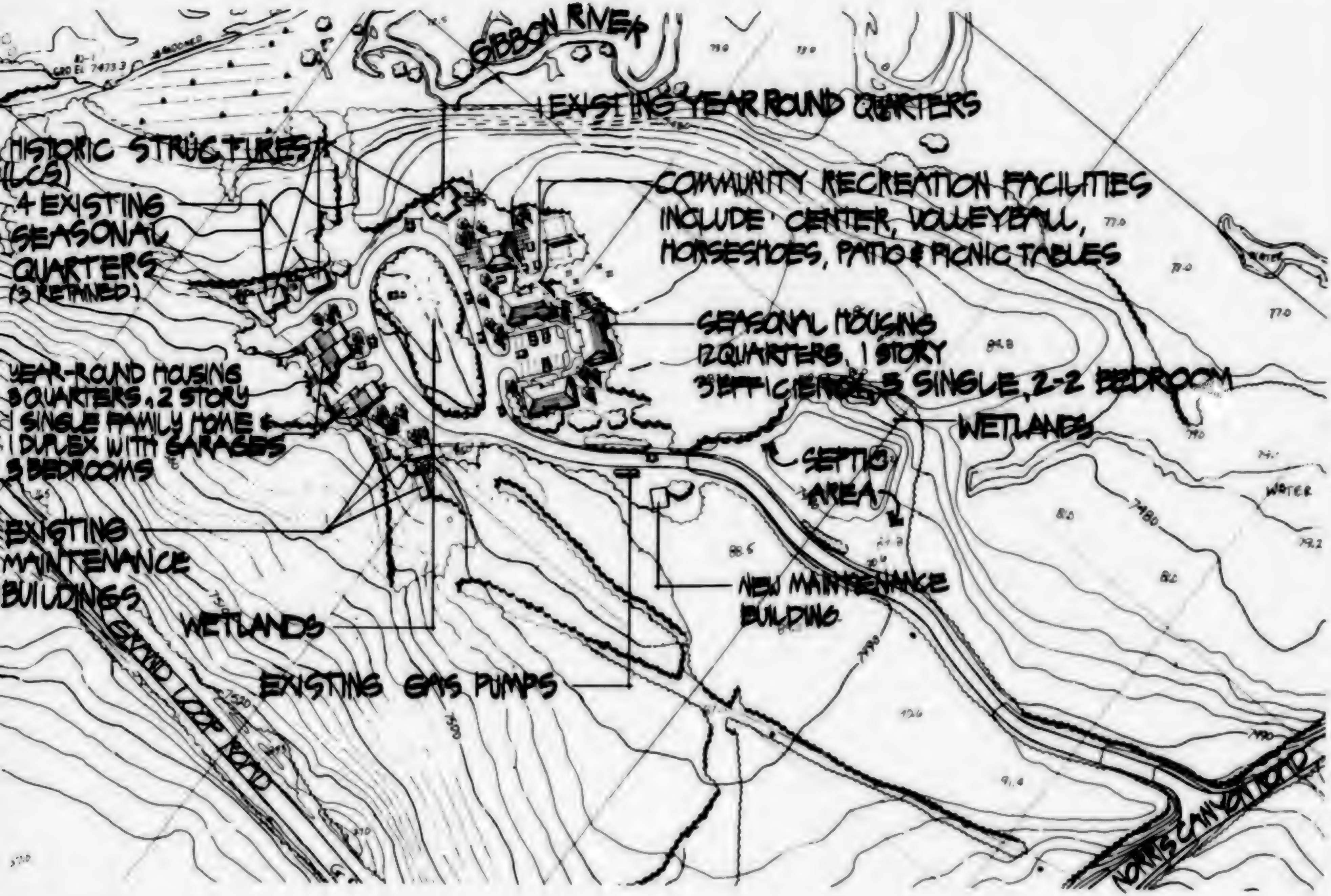

Gibbon River
Historic (LCS) Buildings to Remain 3 Seasonal Quarters
1 - 1 Bedroom
1 - 2 Bedroom
Historic (LCS) Building to Remain 1 Year-round Quarters
Year-round Housing
3 Quarters
2 Story Single Family Homes With Garages
3 Bedroom
Wetlands
Community Recreation Center
Includes: Center, Volleyball, Horseshoes, Patio, and Picnic
Existing Utility Building (Retained)
To Mammoth
Wetlands
Maintenance And Administration
Seasonal Housing
12 Quarters
1 Story Homes
1 & 2 Bedrooms
Existing Maintenance Building and Administration Building (Retained For Storage)
GRAND LOOP ROAD
NORRIS / CANYON ROAD
WATER
7480
7500
7520

Program Summary
Retain 1 Year-round Quarters
Retain 3 Seasonal Quarters
Construct 3 Year-round Quarters
Construct 12 Seasonal Quarters

THE PROPOSAL
YELLOWSTONE NATIONAL PARK
Norris Park Employee Housing

101 / 40294 / May 92

NORTH

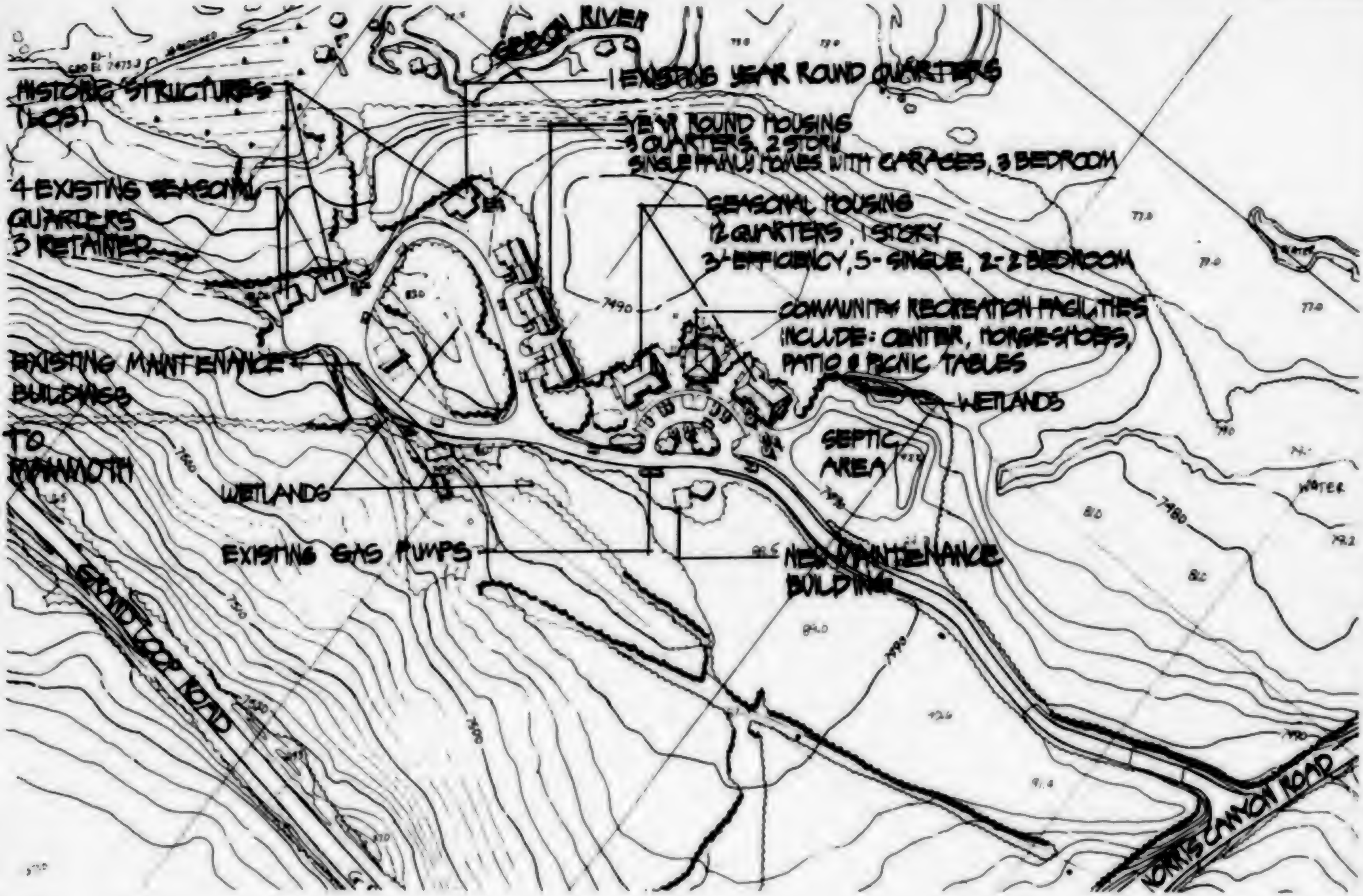

GIBBON RIVER
1 EXISTING YEAR ROUND QUARTERS
HISTORIC STRUCTURES (LCS)
4 EXISTING SEASONAL QUARTERS (3 RETAINED)
COMMUNITY RECREATION FACILITIES INCLUDE CENTER, VOLLEYBALL, HORSESHOES, PATIO & PICNIC TABLES
SEASONAL HOUSING 12 QUARTERS, 1 STORY 3 EFFICIENCIES, 5 SINGLE, 2-2 BEDROOM
YEAR-ROUND HOUSING 3 QUARTERS, 2 STORY 1 SINGLE FAMILY HOME & 1 DUPLEX WITH GARAGES 3 BEDROOMS
WETLANDS
SEPTIC AREA
EXISTING MAINTENANCE BUILDINGS
NEW MAINTENANCE BUILDING
WETLANDS
EXISTING GAS PUMPS
GRAND LOOP ROAD
NORRIS CANYON ROAD
WATER
7480
7520
7500
7490

ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

Norris Park Employee Housing

101 / 40295 / May 92



ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

Norris Park Employee Housing

101 / 40296 / May 92

NORTH

NORTHEAST ENTRANCE

PURPOSE AND NEED

Gold was found in the vicinity of Cooke City, Montana prior to the establishment of Yellowstone National Park. The easiest access to Cooke City was, and remains, the route from the west which follows the Yellowstone River-Lamar River-Soda Butte Creek drainages. In 1903, a soldier station was constructed on the opposite side of the creek from the present entrance station. Travel through this station was limited until the construction of the Beartooth Highway in the 1930s. The Beartooth Highway allows vehicular access to Yellowstone Park along a route from Billings, Montana. This is the least used of the five park entrances; approximately five percent of traffic entering Yellowstone is via the Northeast Entrance. The present ranger station and residence was built in 1933. The present entrance station was constructed in 1935.

Today, the Northeast Entrance area is the National Park Service staging area for maintenance functions, entrance gate services, resource and visitor protection, and emergency services for the Lamar Subdistrict. Housing is provided for NPS employees associated with area operations.

Employees who live within the Northeast Entrance area are affiliated with the NPS ranger and maintenance divisions. The total number of employees working in this area averages 8, with approximately 3 being year-round and 5 being seasonal. However, existing housing will accommodate only 1 year-round employee and 4 seasonal employees. The remaining employees commute to Northeast Entrance from the Cooke City-Silvergate, Montana area.

Staffing projections indicate that a total of 10 NPS employees would eventually be duty-stationed at Northeast Entrance. Housing would be provided for all employees in this area, with 3 housed year-round and 7 housed seasonally. In accordance with park policy, the existing 2 mobile homes and 2 transa-homes would be removed and replaced with permanent structures. No existing residences meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities.

The building containing the ranger station and the year-round ranger residence is sited in close proximity to the main road. This combination of uses close to the road results in a lack of privacy for the resident, since visitors frequently attempt to utilize ranger services after hours.

Existing maintenance facilities are adequate in size for current and projected future operations, but are not winterized.

Water storage facilities should be constructed in order to provide adequate fire protection capabilities.

Since the Mammoth Hot Springs-Cooke City road is kept open throughout the winter, the Northeast Entrance area remains operational during the winter months. In order to serve the needs of visitors and protect the resources of the park at this time of the year, ranger and maintenance services would need to be provided from winterized facilities at Northeast Entrance.

ALTERNATIVES

In the development of the community planning proposal for the Northeast Entrance area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternative One, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the Northeast Entrance area were evaluated for their suitability to support employee housing and maintenance facilities. Of these areas, only Area "A" was considered to be unsuitable for new development, due to its poor solar exposure. Areas "B" and "C" were considered most suitable for development, although Area "C" is visible from the main road. In addition to these general parameters, other site-specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required extensive new disturbance of ground, required construction in steeply sloped areas, would not have retained the historic ranger residence, or would have been more visible from public roadways.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Northeast Entrance area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Most employees who were housed in the area would continue to live in substandard temporary homes. The residence adjacent to the main road would continue to be mistaken for a ranger station, precluding any sense of privacy for its occupants. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Employee housing and maintenance facilities would not be winterized. Water storage capacity would continue to be inadequate for fire protection.

The Proposal

This plan addresses the community needs identified for the Northeast Entrance area through redevelopment of existing areas and development of some undisturbed areas for construction of new employee housing and recreational facilities. The existing historic ranger residence would be retained. Additional housing for NPS employees would be added and maintenance and utility concerns would be addressed. The majority of new construction would occur in disturbed areas. However, a small forested area would be disturbed for construction of the houses.

Housing

The projected needs for park employee housing would be met with this plan. Three new two-story, year- round quarters would be located in a cluster, higher up on the hillside than the existing temporary residences, in order to increase solar exposure. With the provision of these quarters, the existing ranger residence would no longer be needed for year-round housing and would eventually be used for offices. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. New construction would meet NPS housing design standards.

Seven seasonal quarters would be provided in a cluster of newly constructed one-story buildings located west of the new year-round units, in an area with less desirable solar exposure. The phasing in of these houses would be straightforward, since construction of the community center could be deferred until residents have transferred from the existing transa-homes to the new seasonal quarters. In addition, the existing ranger residence would be converted to seasonal housing, to be used as needed, with the expectation that the building could be converted to office use in the future. All work on this building would be done in accordance with historic building guidelines. New construction and rehabilitation would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

Existing facilities would be retained and fully winterized.

Recreational Facilities A small community center with associated outdoor recreation facilities would be provided east of the new year-round houses, where the transa-homes are currently located.

Utilities Water storage facilities for fire protection needs would be constructed.

Alternative One

This plan partially addresses the community needs identified for the Northeast Entrance area through redevelopment of existing areas and development of some undisturbed areas for construction of new employee housing and recreational facilities. The existing historic ranger residence would be retained, with its current year-round residential use. Additional housing for NPS employees would be added, although some of the housing would not have desirable solar exposure. Maintenance and utility concerns would be addressed. The majority of new construction would occur in disturbed areas. However, a small forested area would be disturbed for construction of the houses.

Housing The projected needs for park employee housing would be met with this plan. Three new two-story, year-round quarters would be located in a cluster, higher up on the hillside than the existing temporary residences, in order to increase solar exposure. With the provision of these quarters, the existing ranger residence would no longer be needed for year-round housing. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. New construction would meet NPS housing design standards.

Seven seasonal quarters would be provided in a cluster of newly constructed one-story units located south of the new year-round units, in an area with less solar exposure. Phasing in of these units would be straightforward, since construction of the community center could be deferred until seasonal residents have moved from the existing transa-homes into the new seasonal quarters. In addition, the existing ranger residence would be converted to seasonal housing, to be used as needed, with the expectation that the building could be converted to office use in the future. All work on this building would be done in accordance with historic building guidelines. New construction and rehabilitation would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance	Existing facilities would be retained and fully winterized.
Recreational Facilities	A small community center with associated outdoor recreation facilities would be provided east of the new year-round houses, where the transa-homes are currently located.
Utilities	Water storage facilities for fire protection needs would be constructed.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the Northeast Entrance vicinity were formed on an alluvial fan derived from andesite and limestone bedrock. The average soil texture is loam with 12 to 22 percent gravel. The surficial geology map indicates that lenses of silt and clay may be present. There are a few boulders on the surface. The soil surface is more than 12 inches thick. The soil has a moderately alkaline pH. Depth to bedrock is more than 10 feet. The area slopes 10 to 20 percent to the south. The soils are well-drained and fertile.

The Northeast Entrance area is located in a steep valley. While erosion potential is moderate, debris flow potential is high. Historically there have been occasional occurrences of debris flows through the housing area associated with severe storms and flash floods. There are numerous old channels directly above the housing area associated with these occurrences. No avalanches have been documented in the housing area.

Seismic activity in this area has been monitored. However, the 100-year earthquake occurrence has not been predicted for the area. Studies indicate the potential for a damaging earthquake is low.

Radon readings taken during 1989-1990 in surrounding residences averaged 1.40 picocuries/liter. This suggests that the radon contamination potential in the area is low.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils. Debris flows associated with severe storms and flash floods could continue to occur, potentially endangering residences.

Total impacts under the No-Action Alternative would be minor in the short-term but would in time result in accelerated deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 1.1 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake and debris flow-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

Alternative One
Construction would disturb 0.7 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake and debris flow-resistant structures, as well as site-specific radon measurements prior to construction, would be necessary under Alternative One.

VEGETATION

Affected Environment

The immediate area proposed for development is classified as an ABLA/THOC habitat type with an LP3 cover type. The overstory is co-dominated by lodgepole pine and Engelmann spruce, with lodgepole pine, Engelmann spruce, and scattered subalpine fir present in the understory. The herbaceous layer is dominated by the forbs western meadowrue, common snowberry, northern bedstraw, sticky geranium, graceful cinquefoil, yarrow, fireweed, showy aster, and the exotic common dandelion; and by the graminoids elk sedge, bearded wheatgrass, fringed brome, fowl bluegrass, western ryegrass, and the exotic smooth brome. The vegetation is typical of cool, moist, high-elevation forests, and is not indicative of a wetland community.

No sensitive, threatened, or endangered plant species were found in the area.

Environmental Consequences

No-Action Alternative
Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in continued deterioration of vegetation, primarily in the developed area.

The Proposal
The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 1.1 acres. Some lodgepole pines, including potential hazard

trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short-term, but some deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One
Construction would disturb 0.7 acres. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

Large mammals found in the Northeast Entrance area include moose, elk, deer, grizzly bear, and black bear. Along the slopes of the surrounding mountains, wolverines, mountain lions, non-native mountain goats, and bighorn sheep are found. Smaller mammals include coyote, snowshoe hare, red squirrel, mice, and voles.

Some of the prominent bird species in the immediate area are the Steller's jay and hermit thrush. Other birds using this general area of the park are ruffed grouse, sandhill crane, spotted sandpiper, common snipe, great horned owl, Northern saw-whet owl, great gray owl, white-throated swift, calliope hummingbird, broad-tailed hummingbird, rufous hummingbird, hairy woodpecker, three-toed woodpecker, Northern flicker, olive-sided flycatcher, Hammond's flycatcher, tree swallow, Clark's nutcracker, common raven, mountain chickadee, red-breasted nuthatch, American dipper, ruby-crowned kinglet, Swainson's thrush, Lincoln's sparrow, and Cassin's Finch.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include the tiger salamander and possibly the boreal toad, striped chorus frog, and Western spotted frog. Reptile species possibly include the wandering garter snake and rubber boa.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 1.1 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts on amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 0.7 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

The Northeast Entrance is not in any 100- or 500-year floodplains. However, there is some evidence that the housing area is located in a flash-flood hazard area. There are numerous channels and gullies on the south slope of Meridian Peak flowing in the direction of the housing area and having zones of debris flows. Apparently, flash floods and debris flows are possible during intense storms. A perennial stream flows to the west of the development. Some maintenance actions have been directed at channelizing this stream. No formal studies have been done on the site.

A wetland inventory of this area has been completed. No wetlands were identified in the vicinity of the project area.

Environmental Consequences

No-Action Alternative

There would be no impacts to wetlands under this alternative.

The Proposal

There would be no impacts to wetlands under this alternative.

Alternative One

There would be no impacts to wetlands under this alternative.

WATER QUALITY

Affected Environment

Soda Butte Creek originates outside the park boundary near Cooke City, Montana; it flows past the project area, approximately 600 feet to the south. Impacts to this stream from the effects of mine drainage near Cooke City have been documented. Monitoring indicates a substantial reduction in concentrations of iron and in macroinvertebrates. Failure of the tailings pond could drastically alter water quality and further affect the associated fisheries and macroinvertebrates.

The Northeast Entrance water supply is taken from wells near Soda Butte Creek and treated south of the area. The system has a storage capacity of 1000 gallons. The capacity of the system is insufficient for area fire protection.

The wastewater from the housing area is treated using a "North Dakota Mound" septic-leaching system. The treatment mound lies across the highway from the residential area. Currently, the wastewater treatment system is adequate.

The National Park Service, in cooperation with the Soil Conservation Service, operates a snow survey course and automated snotel site near the existing housing area in order to determine water yield in the Yellowstone River Basin. Clearance of 100 to 400 feet is recommended around the snotel site to avoid influencing snow pillow measurements. In order to maintain baseline snow pack data, the snow survey course would be retained in the present location.

Environmental Consequences

No-Action Alternative

Continued operations at the Northeast Entrance would result in potential sources of surface and groundwater pollution in this area, including stream degradation from road maintenance; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program to replace leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The domestic water supply is adequate, but there is insufficient water storage capacity.

The snow survey course and snotel site would not be affected by this action.

The Proposal

The storage capacity of the Northeast Entrance domestic water supply storage would not be sufficient for the proposed development. Any further development of the Northeast Entrance area would require the expansion and upgrading of the existing water system.

Construction activities would have minor impacts on surface and groundwater sources and adjacent wet meadow areas. Sources of impacts potentially include increased stream sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper attention to construction techniques, no significant impact to the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects to the area's water resources.

The snow survey course would be retained in its present location. However, the snotel site would require relocation by the Soil Conservation Service.

Alternative One

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

The snow survey course and snotel site would be retained in their present location. However, due to the proximity of the housing, there would be an impact on snow pack measurements since snow deposition would be influenced by the required tree removal.

FISHERIES

Affected Environment

Soda Butte Creek supports populations of the Yellowstone cutthroat trout, mountain sucker, longnose sucker, and longnose dace. Non-native species include rainbow and brook trout.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts on the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Alternative One

Impacts to fisheries would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Northeast Entrance area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke.

Localized emissions from wood burning stoves and motor vehicles are sometimes visible in the immediate area during temperature inversions.

There is no air quality monitoring equipment in the Northeast Entrance area and baseline data specific to this area is not available. The closest air monitoring station is south at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the southwest at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes from construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The Northeast Entrance developed area contains relatively few facilities and supports only a small housing area. It is surrounded by forest and meadows and has terrain features that help reduce visibility and intrusiveness.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The employee housing area would generally be screened from the view of visitors along the Northeast Entrance Road. Removal of the existing mobile homes would improve the aesthetic appearance of the area. Nighttime light pollution from the area would increase.

Alternative One

Impacts to the visual quality would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located within and adjacent to the Northeast Entrance government housing area. The majority of the proposed new construction would take place north of the current developed area. The potential exists for the project to affect historic structures, including the nationally significant Northeast Entrance Station.

There are four historic structures in the Northeast Entrance area. These include the ranger station/residence (# 251, eligibility to the National Register of Historic Places undetermined), the Northeast Entrance Station (# 254, a National Historic Landmark), a cabin/office (# 256, eligibility to the National Register of Historic Places undetermined), and a sign cache/shop (# 257, eligibility to the National Register of Historic Places undetermined). All structures would be treated as eligible for the National Register of Historic Places until a formal determination of eligibility is completed.

An intensive archeological inventory of the area proposed for development, made in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, found no archeological resources (Cannon 1991).

Environmental Consequences

For all alternatives, no known archeological resources would be affected by the proposed project. If further archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the appropriate State Historic Preservation Office.

The proposed project has the potential to visually affect the four historic structures. The Northeast Entrance Station is a nationally significant building. The potential negative visual impacts of the proposed project on the entrance station would be lessened because of the vegetation and topographic screening that currently separates it from the new housing area. The other three historic structures have not been evaluated for the National Register and, therefore, would be treated as if they were eligible.

The National Park Service would ensure that all new construction and design work would be carried out in conformance with the Secretary of the Interior

Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The hub of visitor use in this area is the entrance station. According to National Park Service records, during the period January 1 through December 31, 1990, the Northeast Entrance was the entry point for five percent of Yellowstone visitors. Visitors obtain permits, information, and emergency services at the entrance station when it is open. When the entrance station is closed, visitors obtain services at an office attached to the ranger residence. A picnic area is located along Soda Butte Creek, near the entrance station. The road from the Northeast Entrance to Gardiner is plowed year-round, in order to provide automobile access for the communities of Silver Gate and Cooke City, Montana. During summer months, the entrance road provides access to the Beartooth Highway northeast of the park, as well as to Sunlight Basin and Cody, Wyoming.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact. This issue is addressed in the "Visual Quality" section for the Northeast Entrance.

Environmental Consequences

No-Action Alternative

Under this alternative, the existing mobile homes would remain, lessening the visual quality of the visitor experience. Visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected, due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. The visual quality of the area would be improved and more employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

NATIONAL PARK SERVICE OPERATIONS

Affected Environment

The National Park Service administers their maintenance operations, visitor services, protection, and emergency services for the eastern half of the Lamar Subdistrict from this area. The Northeast Entrance is strategically located to provide acceptable response time to emergency situations west and east of the area. The NPS operates an entrance station, ranger office, government maintenance facilities, water supply, and waste water treatment system at this site. NPS employee quarters consist of 1 single-family residence, 2 transa-homes, and 2 mobile homes. During peak season, the NPS employs an average of 8 employees at Northeast Entrance. The communities of Silver Gate and Cooke City, Montana are located a few miles east of Northeast Entrance. Since both communities are resort towns, rental quarters are scarce and very expensive during the summer months. Some advantages to the governments' retention of a housing area in the present location are the absence of cost for building sites and the fact that the infrastructure is already in place.

Environmental Consequences

No-Action Alternative

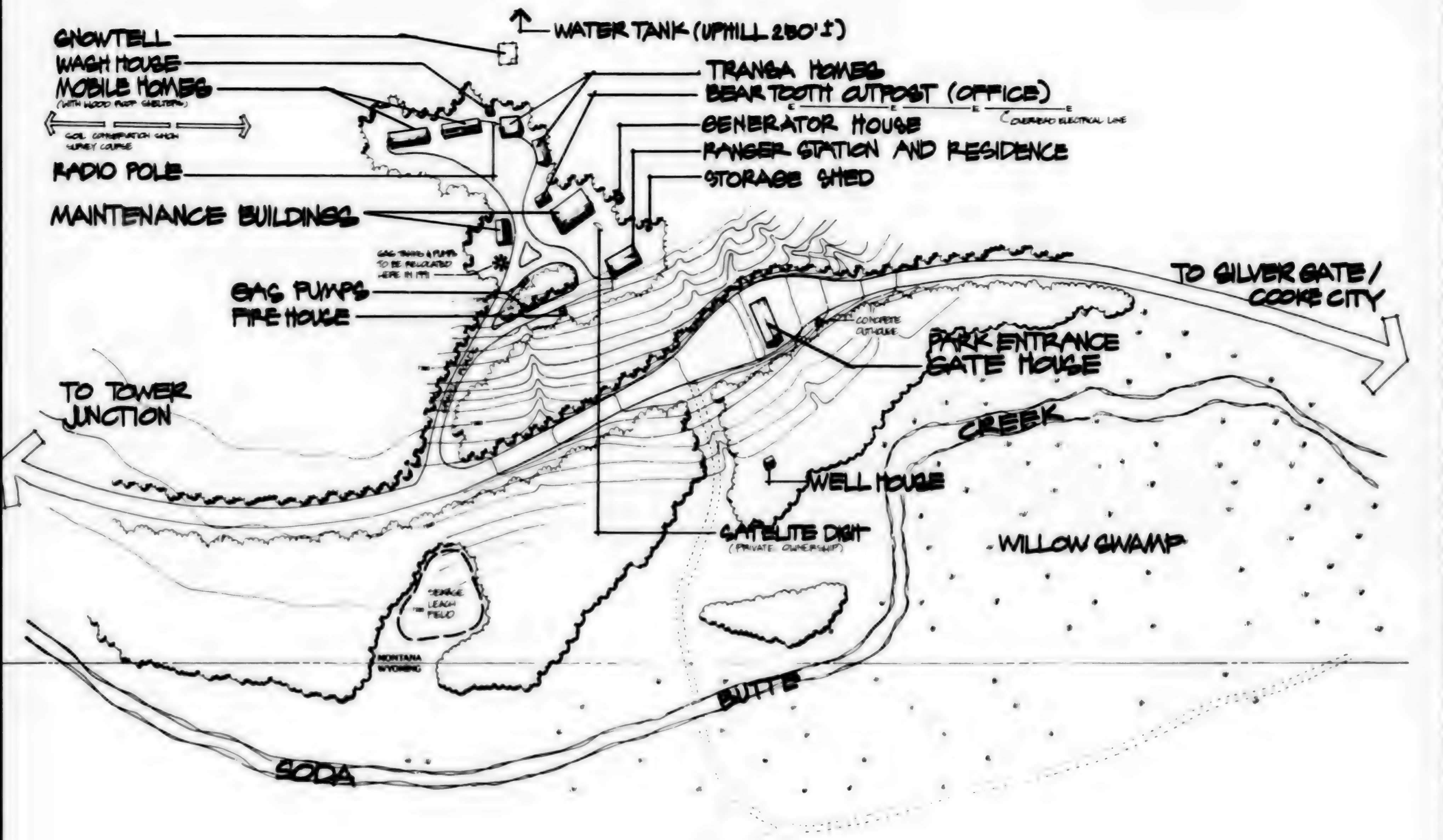
This alternative would have no immediate adverse impacts on the NPS operations in the Northeast Entrance area. However, in the long term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could create an adverse impact on the National Park Service's hiring ability and therefore on their operations.

The Proposal

The proposal meets the NPS program requirements for housing. Constructing new housing units for NPS employees would improve employee morale by providing better housing with increased privacy, additional living and storage space, and by alleviating overcrowding. Recreation and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the Proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents during the construction phase. This would be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.



EXISTING CONDITIONS

YELLOWSTONE NATIONAL PARK

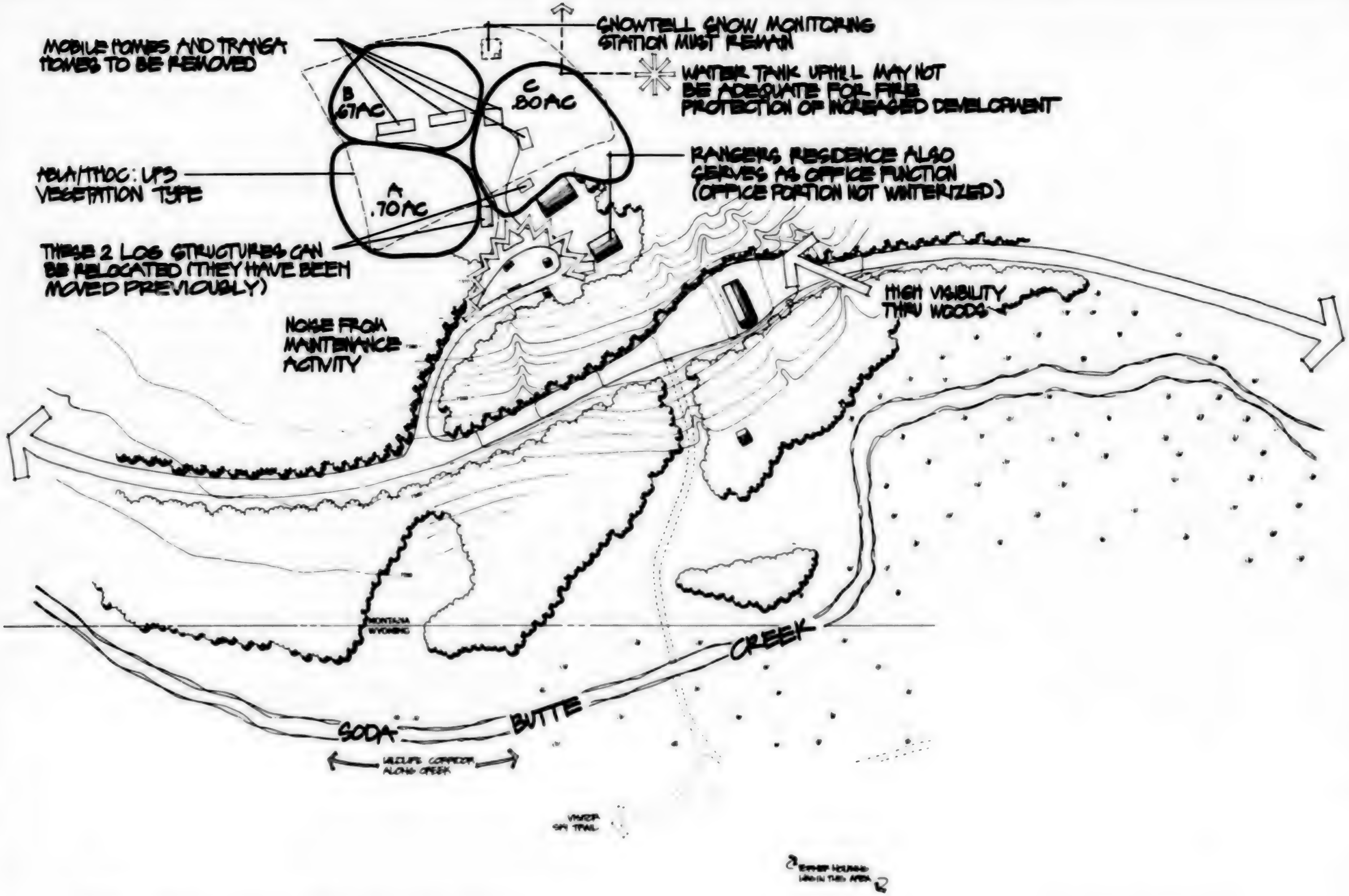
Northeast Entrance Employee Housing

165

101 / 40297 / May 92

NORTH

0 25 50 100 150


MOBILE HOMES AND TRANSA HOMES TO BE REMOVED
SNOWTELL SNOW MONITORING STATION MUST REMAIN
WATER TANK UPHILL MAY NOT BE ADEQUATE FOR FIRE PROTECTION OF INCREASED DEVELOPMENT
B .67 AC
C .80 AC
A .70 AC
ABLA/THOC: UPS VEGETATION TYPE
RANGERS RESIDENCE ALSO SERVES AS OFFICE FUNCTION (OFFICE PORTION NOT WINTERIZED)
THESE 2 LOG STRUCTURES CAN BE RELOCATED (THEY HAVE BEEN MOVED PREVIOUSLY)
NOISE FROM MAINTENANCE ACTIVITY
HIGH VISIBILITY THRU WOODS
MONTANA
WYOMING
SODA BUTTE CREEK
WILDLIFE CORRIDOR ALONG CREEK
WATER SKI TRAIL
OTHER HOUSING WITHIN THIS AREA

AREAS CONSIDERED FOR DEVELOPMENT

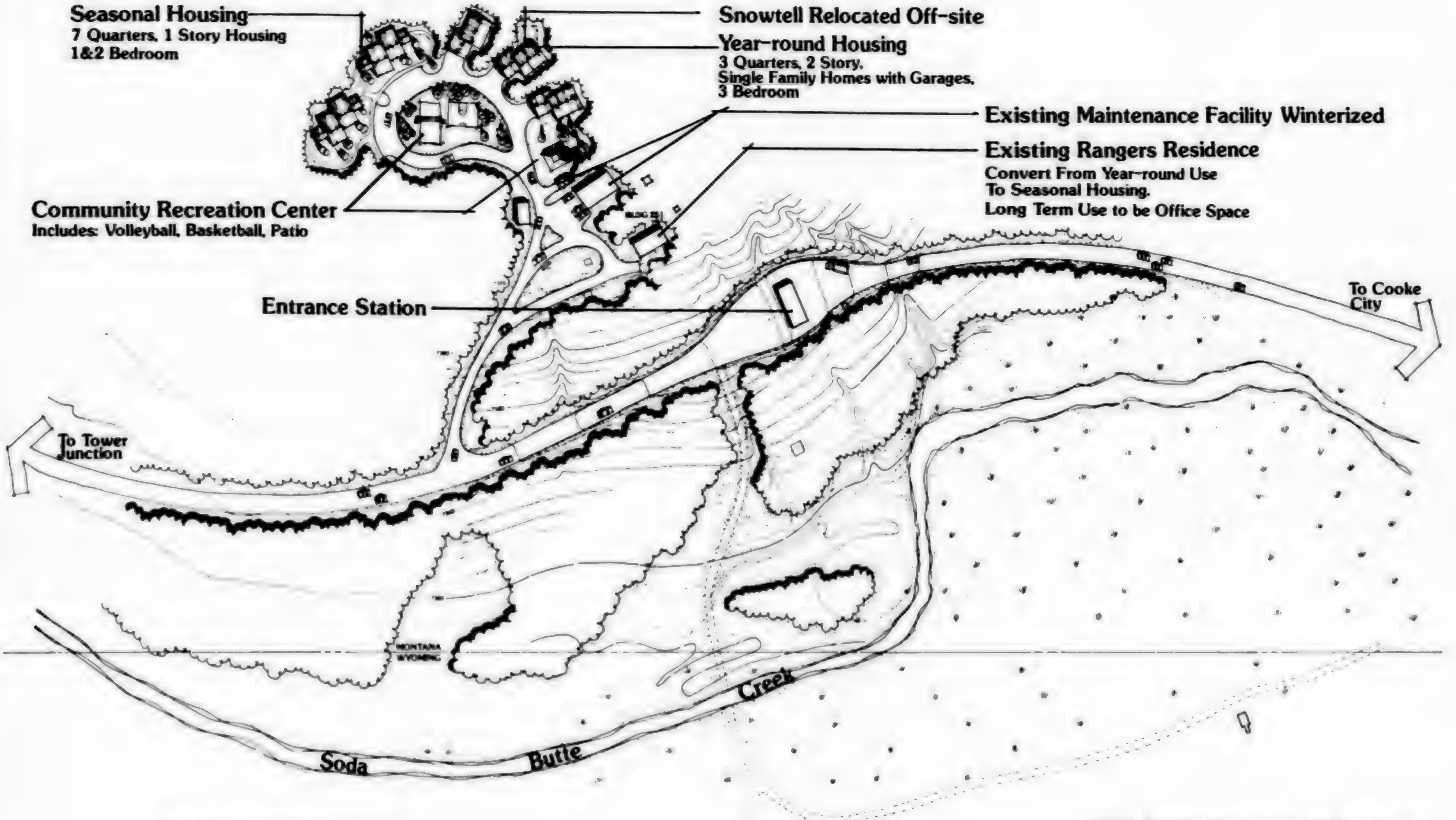
YELLOWSTONE NATIONAL PARK

Northeast Entrance Employee Housing

101 / 40298 / May 92

NORTH

0 25 50 100 150


Seasonal Housing
7 Quarters, 1 Story Housing
1&2 Bedroom
Snowtell Relocated Off-site
Year-round Housing
3 Quarters, 2 Story,
Single Family Homes with Garages,
3 Bedroom
Existing Maintenance Facility Winterized
Existing Rangers Residence
Convert From Year-round Use
To Seasonal Housing.
Long Term Use to be Office Space
Community Recreation Center
Includes: Volleyball, Basketball, Patio
Entrance Station
To Cooke City
To Tower Junction
MONTANA
WYOMING
Soda Butte Creek

NOTE: The Existing Conditions Data Is Based
Upon A Compilation Of Information.

NOTE: Building Development Will Require
Upgrade Of Regular and Auxiliary Power,
Sewage, Water, and Fire Protection

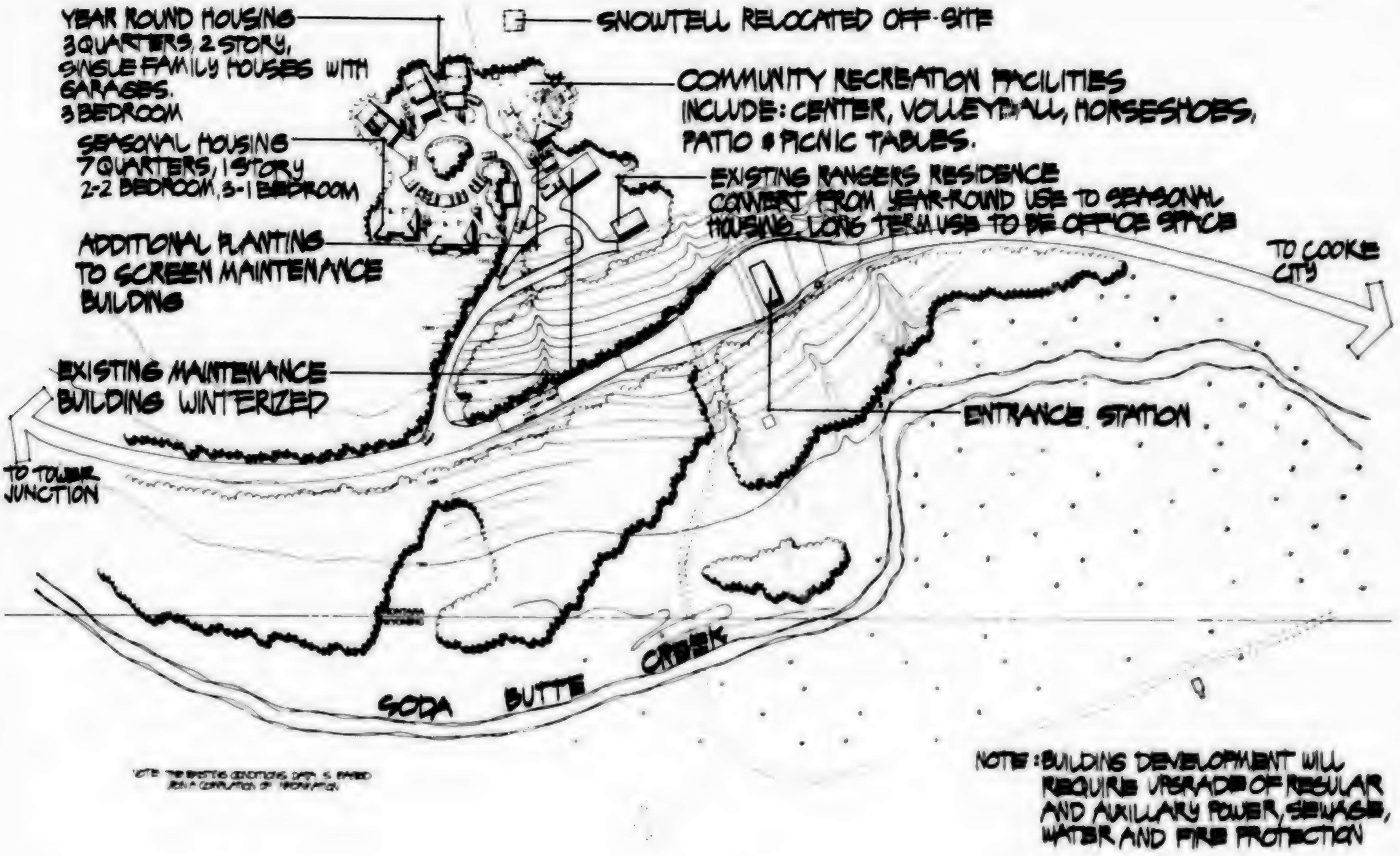
Program Summary
Retain 0 Year-round Quarters
Retain 1 Seasonal Quarter
Construct 3 Year-round Quarters
Construct 7 Seasonal Quarters

THE PROPOSAL
YELLOWSTONE NATIONAL PARK
Northeast Entrance Employee Housing

101 / 40299 / May 92

NORTH

0 25 50 100 150
SCALE: 1"=50'



YEAR ROUND HOUSING
3 QUARTERS, 2 STORY,
SINGLE FAMILY HOUSES WITH
GARAGES.
3 BEDROOM

SEASONAL HOUSING
7 QUARTERS, 1 STORY
2-2 BEDROOM, 3-1 BEDROOM

ADDITIONAL PLANTING
TO SCREEN MAINTENANCE
BUILDING

EXISTING MAINTENANCE
BUILDING WINTERIZED

SNOWTELL RELOCATED OFF-SITE

COMMUNITY RECREATION FACILITIES
INCLUDE: CENTER, VOLLEYBALL, HORSESHOES,
PATIO & PICNIC TABLES.

EXISTING RANGERS RESIDENCE
CONVERT FROM YEAR-ROUND USE TO SEASONAL
HOUSING. LONG TERM USE TO BE OFFICE SPACE

ENTRANCE STATION

NOTE: THE EXISTING CONDITIONS DATA IS BASED
ON A COMPILATION OF INFORMATION

NOTE: BUILDING DEVELOPMENT WILL
REQUIRE UPGRADE OF REGULAR
AND AUXILLARY POWER, SEWAGE,
WATER AND FIRE PROTECTION

ALTERNATIVE ONE
YELLOWSTONE NATIONAL PARK
Northeast Entrance Employee Housing

101 / 40300 / May 92

SOUTH ENTRANCE

PURPOSE AND NEED

Prior to 1902, the south route into Yellowstone (constructed during the 1890s) was a rough, barely cleared route, with trees and stumps in the middle of a pathway. In 1902, ten bridges and forty culverts were installed along the South Entrance Road. With the improvement of the South Entrance Road, the Snake River Soldier Station was constructed by the army in 1902. This station included officers quarters and stables. After the creation of the National Park Service in 1916, the station continued to be staffed.

Today, the South Entrance area is the National Park Service staging area for resource and visitor protection and emergency services for the South Entrance Subdistrict. In addition, an entrance gate station exists, although it is currently unmanned in the summer. It is anticipated that the station will be manned in the future. This area also provides housing for NPS employees associated with area operations.

Employees who live within the South Entrance area are affiliated with the NPS ranger division. The total number of employees working in this area averages 17, with approximately 5 being year-round and 12 being seasonal. While existing housing will accommodate all current seasonal employees, only 3 year-round employees can be accommodated. The remaining one to two employees must commute to South Entrance from Grant Village; Moose, Wyoming; or Flagg Ranch, Wyoming.

Staffing projections indicate that a total of 17 NPS employees would eventually be duty-stationed at South Entrance. Housing would be provided for all employees in this area, with 5 housed year-round and 12 housed seasonally. In accordance with park policy, the existing 5 mobile homes would be removed and replaced with permanent structures. Most other residential structures at South Entrance can be used for the foreseeable future, given modest renovation and maintenance; however, the existing bunkhouse for seasonal employees would be difficult to bring up to NPS housing design standards and should be replaced. No existing residences meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities.

A barn, corral, fire cache, and generator currently exist in this area. These facilities are in good condition, are necessary for current and future operations, and would be retained but some need to be winterized.

The existing facilities in the South Entrance area are visible from the main road. Any future construction should be located no closer to the road than existing improvements.

The domestic water supply and water storage facilities are inadequate for current and proposed uses.

The South Entrance area is currently operational during the winter months, since a number of activities are staged from facilities near the Flagg Ranch, just south of the South Entrance. Ranger services would need to be provided from winterized facilities at South Entrance in order to serve the needs of visitors and protect the resources of the park at this time of the year.

ALTERNATIVES

In the development of the community planning proposal for the South Entrance area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The potential exists that employee housing for both South Entrance and the John D. Rockefeller, Jr. Memorial Parkway could be combined in the Flagg Ranch complex (two miles south of South Entrance). This prospect is now under study. If both Parks agree to combine facilities at Flagg Ranch, the proposed action for South Entrance evaluated in this document would be superseded.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the South Entrance area were evaluated for their suitability to support employee housing. Of these areas, only Area "B" was considered to be unsuitable for new development, due to its visibility from the main road. Area "A" was determined to be suitable for development if concerns for the historic bunkhouse could be addressed and Area "C" was considered most suitable for development. In addition to these general parameters, other site-specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required extensive new disturbance of ground, required construction in wetland or utility areas, would not have retained selected historic structures, would have been visible from public roadways, or would have poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the South Entrance area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Many employees who were housed in the South Entrance area would continue to live in substandard seasonal or mobile homes. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Employee housing would not be properly winterized. Domestic water supply and water storage capacity for fire protection would continue to be inadequate. The majority of new construction would occur in previously disturbed areas. However, some areas of sparse to moderate timber density would be disturbed for construction of the new housing. Existing wetlands would remain undisturbed.

The Proposal

This plan addresses the community needs identified for the South Entrance Area through redevelopment of selected areas for employee housing and for community recreation facilities. All existing historic structures, except the bunkhouse, would be retained. Additional housing for government employees would be added.

Housing

The projected needs for park employee housing would be met with this plan. Three new one and one-half story, year-round quarters would be located at South Entrance in a cluster near the existing bunkhouse, where solar access is best. In addition, the existing historic house, a duplex, would be retained, for a total of five year-round quarters. Two new garages would be built to replace the old, inadequately-sized structure currently used as a garage. New construction and rehabilitation would meet NPS housing design standards.

Twelve seasonal quarters would be provided in a combination of existing and newly constructed units. Nine employees would be housed in one- story units in a cluster west of the existing loop. The new construction could be easily phased in, since the community center can be constructed in the area where mobile homes are currently located after the new seasonal quarters are built. In addition, 2 existing year-round residences, containing 3 quarters, would be converted for use as 3 seasonal quarters. The existing bunkhouse would be removed in accordance with Section 106 requirements, due to its substandard condition. New construction and rehabilitation would meet NPS housing design standards.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Recreational Facilities A small community center, with associated outdoor recreational facilities, would be constructed between the new year-round and seasonal housing units in the area where mobile homes are presently located.

Utilities Adequate domestic water supply facilities and water storage facilities for fire protection would be constructed.

Alternative One

This plan partially addresses the community needs identified for the South Entrance area through redevelopment of selected areas for employee housing and for community recreation facilities. All existing historic structures would be retained; the bunkhouse would be retained for non-residential uses. Additional housing for government employees would be added. The majority of new construction would require new disturbance of several areas. Existing wetlands would remain undisturbed.

Housing The projected needs for park employee housing would be met with this plan. Three new one and one-half story, year-round quarters would be located at South Entrance in a cluster near the existing bunkhouse. In addition, the 2 existing historic cabins, which now provide 3 small year- round quarters, would be retained as 2 year-round quarters, for a total of 5 year-round quarters. This would result in year-round units being intermingled with seasonal units, which is not preferred. New construction and rehabilitation would meet NPS housing design standards.

Twelve seasonal quarters would be provided in a combination of existing and newly constructed units. Eight employees would be housed in new one-story units in a cluster around the existing fire cache and year round cabins. In addition, four seasonal quarters would be provided through rehabilitation of the existing ranger residence. The new construction could be easily phased in, since the mobile homes could be retained until the new seasonal quarters are built. New construction would be more visible from the road than is existing development. New construction and rehabilitation would meet NPS housing design standards.

Three recreational vehicle spaces, for use by contractors as needed, would be retained in the area currently used for mobile homes.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Recreational Facilities A small community center, with associated outdoor recreational facilities, would be constructed across the road from the year-round units, requiring disturbance of a sparsely timbered area. This facility would be visible from the main road.

Utilities Adequate domestic water supply facilities and water storage facilities for fire protection would be constructed.

Alternative Two

This plan partially addresses the community needs identified for the South Entrance area through redevelopment of selected areas for employee housing and for community recreation facilities. All existing historic structures would be retained; the bunkhouse would be retained for non-residential uses. Additional housing for government employees would be added. The majority of new construction would require new disturbance of several areas.

Housing The projected needs for park employee housing would be met with this plan. One new one and one-half story, year-round quarters would be located on the western end of the existing road loop. In addition, the two existing historic cabins, which now provide three small year-round quarters, would be retained as two year-round quarters. Finally, the existing ranger residence, a duplex, would be retained and rehabilitated, for a total of five year-round quarters. This would result in year-round units being intermingled with seasonal units, which is not preferred. New construction and rehabilitation would meet NPS housing design standards.

Twelve seasonal quarters would be provided in new one-story units in a cluster on the western end of the existing road loop, northeast of the new year-round unit. The new construction could be easily phased in, since the mobile homes could be retained until the new seasonal quarters are built. New construction would be more visible from the road than is existing development. New construction and rehabilitation would meet NPS housing design standards.

Two recreational vehicle spaces, for use by contractors as needed, would be retained in the area currently used for mobile homes.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Recreational Facilities

A small community center, with associated outdoor recreational facilities, would be constructed east of the new year-round unit in the area previously occupied by the mobile homes. Existing wetlands would be disturbed for construction of the center.

Utilities

Adequate domestic water supply facilities and water storage facilities for fire protection would be constructed.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the South Entrance vicinity are formed from sand and gravel on terraces of the Snake River. The material is primarily rhyolitic. The soil surface textures are sandy loams and vary at the subsurface from sandy loams to loamy sands. Gravels make up 20 to 50 percent of both soil surfaces. The soil surface is 10-12 inches thick. The soils have a very slightly acidic pH. Depth to bedrock is 10 to 60 feet. The slopes range from 0 to 3 percent. The soils are generally well drained with low fertility.

Seismic activity in this area has been monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 6.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences ranged from 0.70 to 5.8 picocuries/liter. This suggests that the radon contamination potential in the area is low to moderate.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in continued deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 0.9 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction, in order to determine whether mitigation measures are necessary.

Alternative One

Under Alternative One, construction would disturb 1.4 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two

Under Alternative Two, construction would disturb 0.8 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

The existing mobile home area is an ABLA/CAGE habitat type with an LP2 cover type. The overstory is dominated by lodgepole pine, with lodgepole pine, subalpine fir, and whitebark pine in the understory. The herbaceous strata is dominated by the forbs silver lupine, fireweed, thick-stemmed aster, rosy pussytoes, raceme pussytoes, sulphur buckwheat, and many-flowered phlox; by the shrubs common juniper and Oregon grape; and by the graminoids Geyer's sedge, little ricegrass, timber oatgrass, and Wheeler's bluegrass.

On the southern edge of the existing mobile homes is a wetland corridor. Surface water flows throughout the year. Streamside vegetation is dominated by the forbs small-fringed gentian, cow parsnip, field mint, arrowleaf groundsel, white bog orchid, and large-leaved avens; by the shrubs bearberry honeysuckle and various willows; and by the graminoids fowl bluegrass, horsetail, dagger-leaf rush, inland sedge, water sedge, Nebraska sedge, and shore sedge. Two plant species of special concern in Wyoming (as noted on *List 2*, Wyoming Natural Diversity Database), Buxbaum's sedge (Carex buxbaumii) and the leathery grape-fern (Botrychium multifidum), were also found along the riparian corridor.

The area east of the corral and south of the existing road is an ABLA/CAGE habitat type with an LP1 cover type. The plant community is similar the LP2 type, except that the lodgepole pine overstory is much younger and the trees are smaller in diameter.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation. Total impacts under the No-Action

Alterative would be minor in the short-term but would in time result in continued deterioration of vegetation, primarily in the developed area.

However, continued free ranging and grazing outside of the corral area for government horses is having unknown impacts on the local populations of two sensitive plant species (Buxbaum's sedge and leathery grape-fern). Immediate measures to halt this grazing should be implemented. A study on the local populations of these two sensitive plant species should be initiated to determine current status.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 0.9 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Continued free-ranging and grazing outside of the corral area for government horses is having unknown impacts on the local populations of two sensitive plant species (Buxbaum's sedge and leathery grape-fern). Immediate measures to halt this grazing would be implemented. Construction activities would avoid these local plant populations. A study on the local populations of these two sensitive plant species would be initiated prior to construction. Overall, impacts to vegetation would be minor in the short-term, but some deterioration of vegetation would occur over time in the developed area.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to more natural conditions. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation.

The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One
Under Alternative One, construction would disturb 1.4 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two
Under Alternative Two, construction would disturb 0.8 acres. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

Large mammals found in the South Entrance area include moose, elk, deer, grizzly bear, and black bear. Smaller mammals include coyote, pine marten, snowshoe hare, Uinta ground squirrel, red squirrel, weasel, mice, and voles.

One of the prominent bird species in the immediate area is the bald eagle. Other birds using this general area of the park are great gray owl and peregrine falcons, as well as Barrow's goldeneye, sandhill crane, spotted sandpiper, common snipe, great horned owl, hairy woodpecker, three-toed woodpecker, Northern flicker, tree swallow, barn swallow, gray jay, Clark's nutcracker, mountain chickadee, red-breasted nuthatch, American dipper, ruby-crowned kinglet, yellow-rumped warbler, and chipping sparrow.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include tiger salamander, boreal toad, striped chorus frog, and Western spotted frog. Reptile species may include wandering and common garter snakes.

Environmental Consequences

No-Action Alternative
Under the No-Action Alternative, there would be no increased impacts on wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal
The proposed action would disturb approximately 0.9 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer and moose. Impacts on

amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 1.4 acres of wildlife habitat, most of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative Two would disturb approximately 0.8 acres of wildlife habitat, most of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

South Entrance is not in any 100- or 500-year floodplains or flash-flood hazard areas.

A wetland inventory of this area has been completed; the only area identified as wetlands is a corridor along the perennial stream, south of the existing mobile homes. Construction would not occur in areas identified as wetlands, except under Alternative Two.

Environmental Consequences

No-Action Alternative

There would be no additional impacts to wetlands under this alternative.

The Proposal

Wetlands adjacent to construction areas would be protected during the construction phase. There would be no additional impacts to wetlands under this alternative.

Alternative One

The effects of this alternative would be the same as the proposed action.

Alternative Two

Approximately 0.3 acres of wetlands would be disturbed under this alternative. Wetlands restoration or mitigation would be undertaken in compliance with Section 404 regulations relating to wetland and NPS guidelines. Other wetlands adjacent to construction areas would be protected during the construction phase.

WATER QUALITY

Affected Environment

The Snake River, located approximately 200 feet from the project area, is considered to be nearly pristine. The South Entrance water supply is taken from a small spring and treated. The system has no storage facilities. The capacity of the system is insufficient for existing conditions, and there is no water storage capacity for structural fire protection.

The South Entrance wastewater treatment system consists of two septic tank/disposal field systems. The system is adequate for current and proposed development.

Environmental Consequences

No-Action Alternative

Continued operations at the South Entrance would result in potential sources of surface and groundwater pollution in this area from road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program to replace leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The domestic water system will require replacement in the immediate future.

The Proposal

The capacity of the South Entrance domestic water supply would not be sufficient for all proposed development. A new spring box with greater capacity would be developed or a new source (perhaps at Flagg Ranch) would be investigated.

Construction activities would have minor impacts on surface and groundwater sources and wet meadow areas. Sources of impacts potentially include increased stream sedimentation due to road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper attention to construction techniques, no significant impact to the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects to the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. Overall impacts would be minor and would not result in any effects on the area's water resources.

FISHERIES

Affected Environment

The Snake River supports populations of the Yellowstone cutthroat trout, rainbow trout, brown trout, lake trout, and mountain white fish.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts to the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Alternative One
Impacts to fisheries would be similar to those described for the proposed action. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two
Impacts to fisheries would be similar to those described for the proposed action. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the South Entrance area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves and motor vehicles are sometimes visible in the immediate area during temperature inversions.

There is no air quality monitoring equipment in the South Entrance area and baseline data specific to this area is not available. The closest air monitoring station is to the north at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located further north at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative
There would be no increased effects on air quality.

The Proposal
It is expected that there would be localized increases in vehicular emissions, dust, and fumes from construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects would not occur in measurable quantities.

Alternative One
Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One would not occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two are would not occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The South Entrance contains housing and a small maintenance area. The project area is currently visible from the South Entrance Road. Screening is minimal between the project area and the South Entrance Road, although the surrounding forest helps reduce visibility to and from the road.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The project would be partly visible from the South Entrance Road. The proposed residences would be less visually obtrusive than some of the existing mobile homes. The new units would be designed and finished in a manner compatible with park architectural themes. Visual impacts from the proposed construction would be minor. However, nighttime light pollution from the area would increase.

Alternative One

New construction would be more visually intrusive than existing development or that of the Proposal.

Alternative Two

Impacts to the visual quality would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in and adjacent to the South Entrance government housing area which is located west of the South Entrance road. Archeological surveys have documented three prehistoric archeological sites within the general vicinity of the South Entrance (Taylor et al. 1964). The sites are on the east side of the Snake River and would not be affected by the proposed development. An intensive survey of the area proposed for development, made in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, was conducted, and one prehistoric site, 48YE58, was located between the housing area and the south boundary in 1991. Limited testing did not reveal any significant deposits and the site is believed to be ineligible for inclusion on the National Register of Historic Places (Cannon, n.d.). A formal Determination of Eligibility will be initiated in the spring of 1992.

There are seven historic structures in the South Entrance government housing area that may be affected by the proposed development. None of the structures have been evaluated for eligibility to the National Register of Historic Places. Since National Register status has not been determined, these structures should be treated as if they are eligible to the National Register. The structures include: ranger station/residence, (# 211); horse barn, (# 212); fire cache, (# 215); garage, (# 686); powerhouse/storage shed, (# 157); powerhouse/storage shed, (# 158); and sign cache, (# 693).

Environmental Consequences

For all alternatives, the project has the potential to affect the seven historic structures.

If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS regional office and the Wyoming State Historic Preservation Office.

The seven historic structures could potentially be affected visually by the proposed project. The potential also exists that historic structures could be removed as a result of the proposed project.

New construction as well as rehabilitation of the seven historic structures would be done in conformance with the Secretary of the Interior Standards for Rehabilitation. Before removal of any of the seven historic structures, appropriate mitigation would be completed, including documentation in accordance with the requirements of the Historic American Building Standards.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The hub of visitor use in this area is the entrance station. A visitor information center and ranger station are located just within the park boundary. Visitors gain access to hiking trails from this area and fish in the Snake River, which flows near the entrance road and ranger station. According to National Park

Service Records, during the period January 1 through December 31, 1990, the south entrance was the entry point for 27 percent of Yellowstone visitors.

During winter months, the park road is not plowed; it is used for oversnow vehicle access into the park. The road from Jackson, Wyoming, and Grand Teton National Park is plowed to Flagg Ranch. The Flagg Ranch area is five miles south of the South Entrance and is used as a staging location for snowmobiles.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact. This issue is addressed in the "Visual Quality" section for South Entrance.

Environmental Consequences

No-Action Alternative

Under this alternative, the existing mobile homes would remain, lessening the visual quality of the visitor experience. Visitor services would be limited those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected, due to low NPS employee morale.

The Proposal

The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. The visual quality of the developed area would be improved and more employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal, except that the visual impacts would be greater than for the existing condition or the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE OPERATIONS

Affected Environment

The National Park Service (NPS) administers their visitor services, protection, and emergency services for the South Entrance Subdistrict from this area. The NPS operates an entrance station, ranger station, water supply, and wastewater treatment system at South Entrance. NPS employee quarters consist of 1 two-family residence, 1 emergency shelter, 1 bunk- house, 1 single-family quarter, and 5 mobile homes. During peak season, the NPS employs an average of 17 employees at South Entrance. Jackson, Wyoming (located 64 miles south of the area), is the closest community to South Entrance (except for Flagg Ranch), and it is not considered to be within a reasonable commuting distance.

Environmental Consequences

No-Action Alternative

This alternative would have no immediate adverse impacts on NPS operations in the South Entrance area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could create an adverse impact on the National Park Service's hiring ability and therefore on their operations.

The Proposal

The proposal meets the NPS program requirements for housing. Constructing new housing units for NPS employees would improve employee morale by providing better housing with increased privacy, additional living and storage space, and by alleviating overcrowding. Recreation and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents during the construction phase. This would only be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

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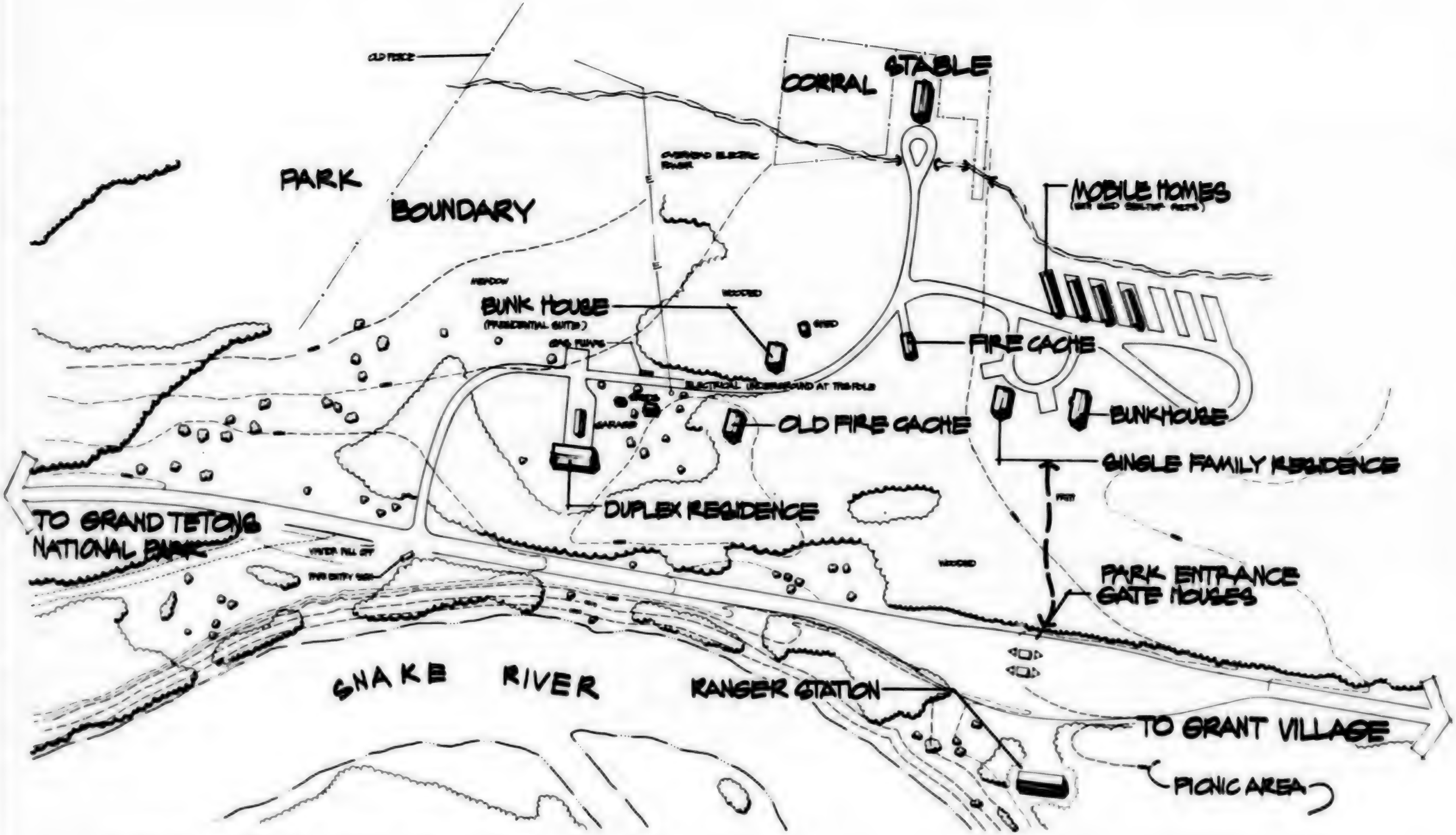
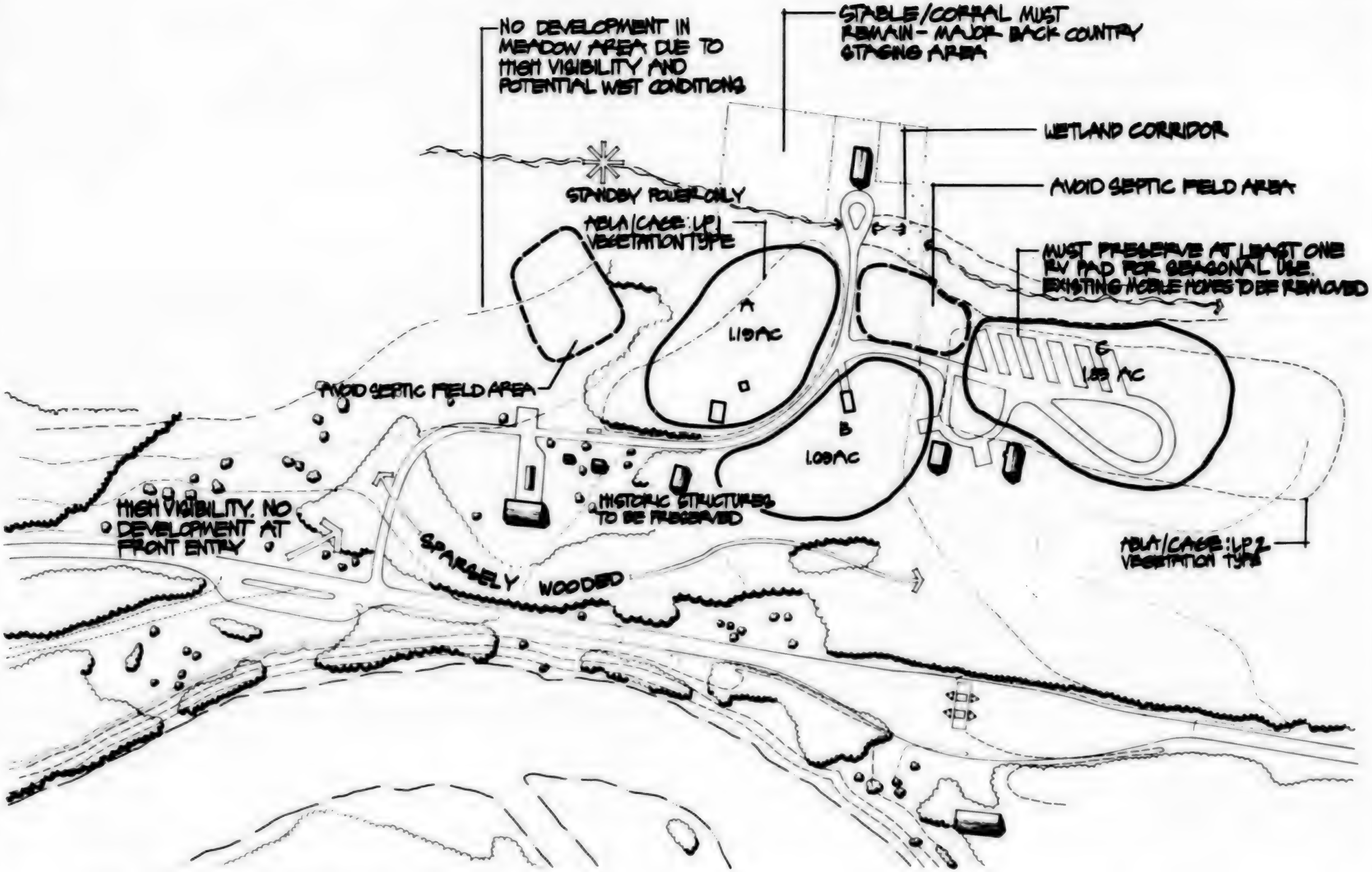


EXISTING CONDITIONS
YELLOWSTONE NATIONAL PARK
South Entrance Employee Housing

101 / 40301 / May 92

NORTH


NO DEVELOPMENT IN MEADOW AREA DUE TO HIGH VISIBILITY AND POTENTIAL WET CONDITIONS
STABLE/CORRAL MUST REMAIN - MAJOR BACK COUNTRY STAGING AREA
WETLAND CORRIDOR
STANDBY POWER ONLY
AVOID SEPTIC FIELD AREA
ABLA/CAGE: LP1 VEGETATION TYPE
A
1.19 AC
MUST PRESERVE AT LEAST ONE RV PAD FOR SEASONAL USE. EXISTING MOBILE HOMES TO BE REMOVED
C
1.85 AC
AVOID SEPTIC FIELD AREA
B
1.09 AC
HISTORIC STRUCTURES TO BE PRESERVED
HIGH VISIBILITY, NO DEVELOPMENT AT FRONT ENTRY
SPARSELY WOODED
ABLA/CAGE: LP2 VEGETATION TYPE

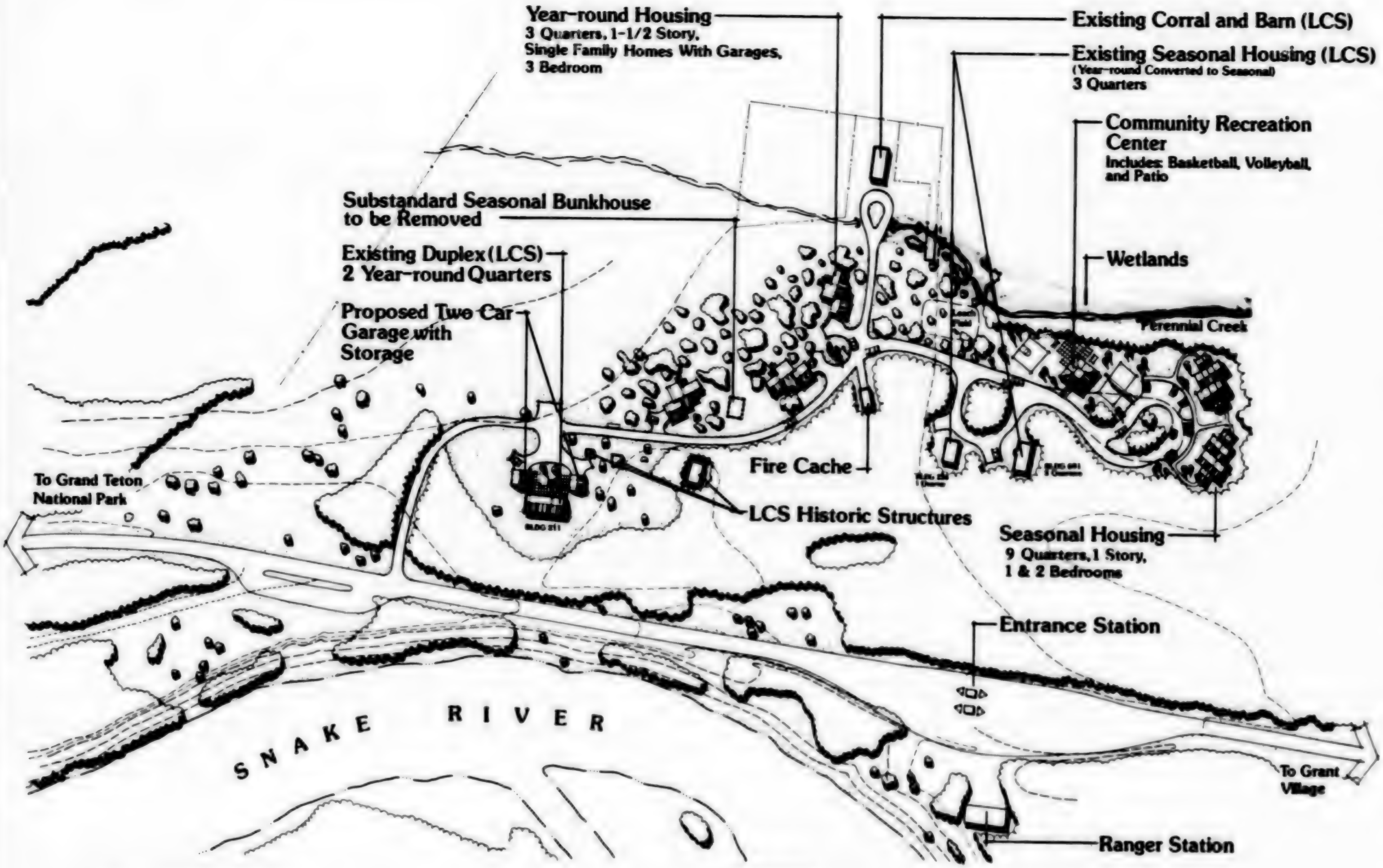
AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

South Entrance Employee Housing

101 / 40302 / May 92

NORTH


Year-round Housing
3 Quarters, 1-1/2 Story,
Single Family Homes With Garages,
3 Bedroom
Existing Corral and Barn (LCS)
Existing Seasonal Housing (LCS)
(Year-round Converted to Seasonal)
3 Quarters
Community Recreation Center
Includes: Basketball, Volleyball, and Patio
Substandard Seasonal Bunkhouse to be Removed
Wetlands
Existing Duplex (LCS)
2 Year-round Quarters
Proposed Two Car Garage with Storage
Perennial Creek
Fire Cache
To Grand Teton National Park
LCS Historic Structures
Seasonal Housing
9 Quarters, 1 Story,
1 & 2 Bedrooms
Entrance Station
SNAKE RIVER
To Grant Village
Ranger Station

Program Summary

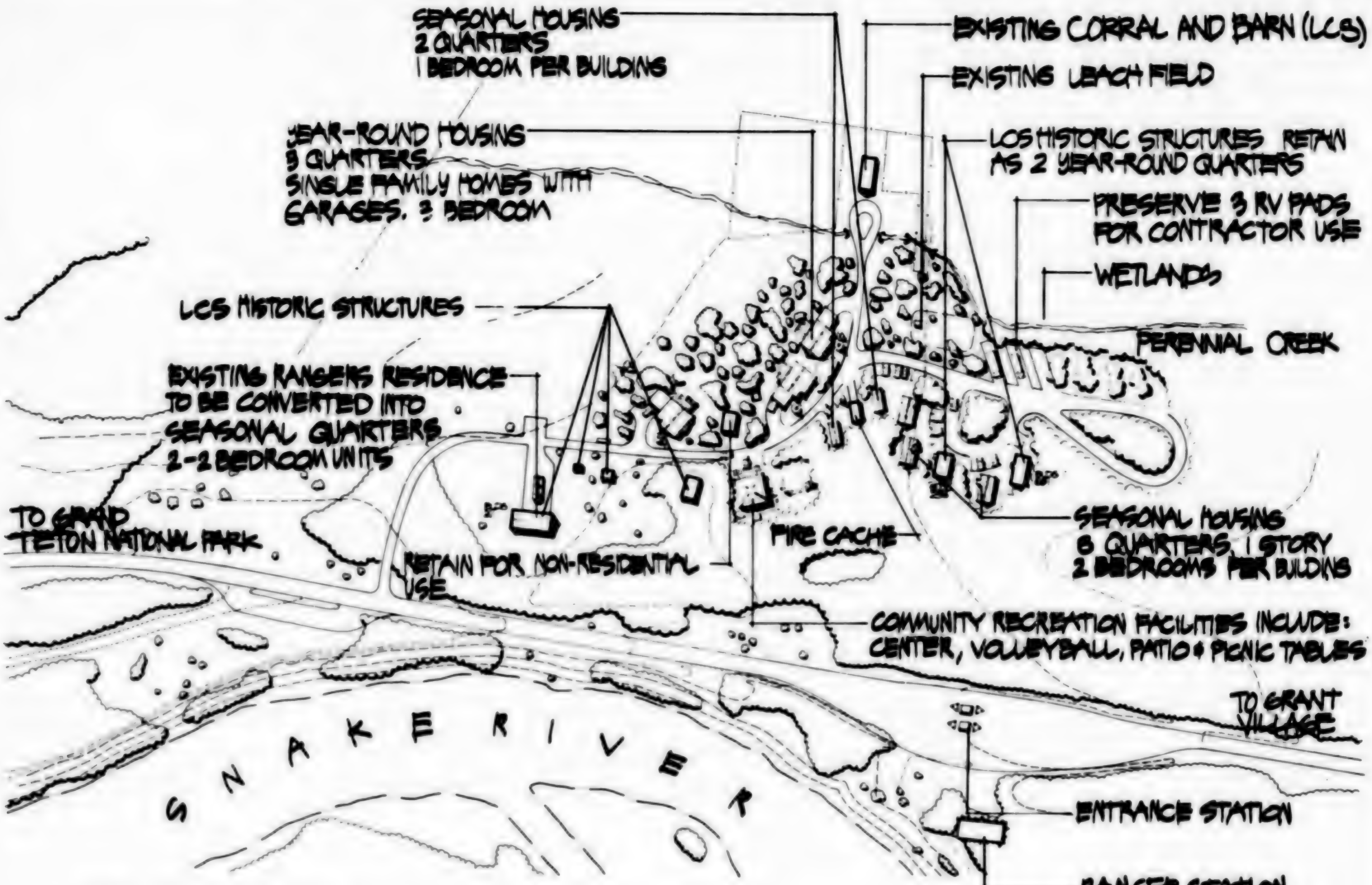
Retain 2 Year-round Quarters
Retain 3 Seasonal Quarters
Construct 3 Year-round Quarters
Construct 9 Seasonal Quarters

THE PROPOSAL

YELLOWSTONE NATIONAL PARK

South Entrance Employee Housing

101 / 40303 / May 92

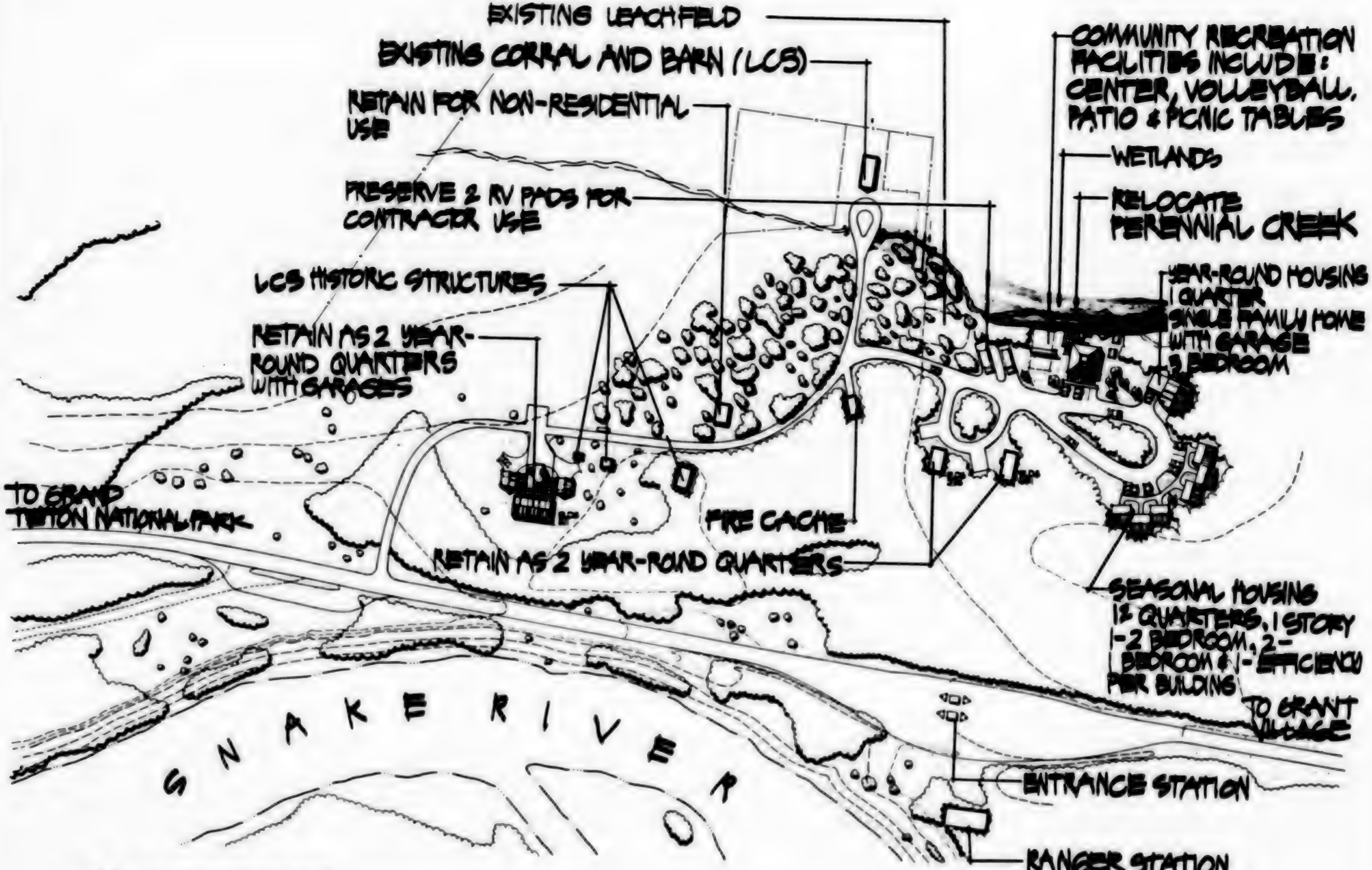


ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

South Entrance Employee Housing

101 / 40304 / May 92


EXISTING LEACHFIELD
EXISTING CORRAL AND BARN (LCS)
RETAIN FOR NON-RESIDENTIAL USE
PRESERVE 2 RV PADS FOR CONTRACTOR USE
LCS HISTORIC STRUCTURES
RETAIN AS 2 YEAR-ROUND QUARTERS WITH GARAGES
TO GRAND TETON NATIONAL PARK
FIRE CACHE
RETAIN AS 2 YEAR-ROUND QUARTERS
COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, VOLLEYBALL, PATIO & PICNIC TABLES
WETLANDS
RELOCATE PERENNIAL CREEK
YEAR-ROUND HOUSING 1 QUARTER SINGLE FAMILY HOME WITH GARAGE 3 BEDROOM
SEASONAL HOUSING 12 QUARTERS, 1 STORY 1-2 BEDROOM, 2-1 BEDROOM & 1-EFFICIENCY PER BUILDING
TO GRANT VILLAGE
SNAKE RIVER
ENTRANCE STATION
RANGER STATION

ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

South Entrance Employee Housing

101 / 40305 / May 92

NORTH

191

TOWER JUNCTION

PURPOSE AND NEED

Tower Junction is located near Lost Creek, 18 miles east of the Mammoth Hot Springs Administrative Headquarters. Lost Creek meanders down the slope of Prospect Peak through lodgepole pine and Douglas-fir forests, across sagebrush flats toward the Yellowstone River. The area of development is located where Lost Creek converges with Lost Lake Creek on the sagebrush flats. Climatically, the area is dry, with less than fifteen annual inches of precipitation and patchy winter snow cover compared to higher elevations of the park.

Historically the Tower Junction area was used by fur trappers, explorers, and Indians who followed the Bannock Trail. The first substantial development in the Tower Junction area was "Camp Roosevelt", a tent camp established in 1904 as the newest addition to the Wylie Permanent Camping Company's touring circuit. In 1908, the army relocated a detachment from Calcite Springs to a new soldier station at Tower Junction. Roosevelt Lodge was built by 1920, and in the twenty years to follow more permanent structures were developed in both the Tower government area and the Roosevelt Lodge area to accommodate visitors and provide related support services.

Contemporary development at Tower Junction is split between the Tower government area to the west of Lost Creek, and the Roosevelt Lodge area to the east of the creek and surrounding the historic lodge. The Tower government area is the National Park Service staging area for maintenance functions, resource and visitor protection and emergency services, interpretive programs and research projects within the Tower Subdistrict. The Roosevelt Lodge area is a concessioner operation providing lodging, dining facilities, a small convenience store, and a corral for visitor use. Both areas provide housing for employees associated with area operations.

Employees who live within the Tower government area are affiliated with the NPS ranger, maintenance, interpretive, and research divisions. The total number of employees working in this area averages 19, with approximately 3 being year-round and 16 being seasonal. However, existing housing will accommodate only one year-round employee and 14 seasonal employees. The remaining three to four employees must commute to Tower from Mammoth Hot Springs or Gardiner, Montana.

Staffing projections indicate that a total of 29 government employees would eventually be duty-stationed at Tower. Housing would be provided for all employees in this area, with four housed year-round and 25 housed seasonally. In accordance with park policy, the existing 5 mobile homes would be removed and replaced with permanent structures. Other residential structures at Tower are in acceptable condition and can be used in the future, given modest renovation and maintenance. No existing residences meet handicapped accessibility standards.

The community plan for this area would include a community center and modest recreation facilities.

The log structure adjacent to the Grand Loop Road has traditionally housed the only year-round resident in the area. The proximity to the road and the rustic architectural style of this single-family home cause it to frequently be mistaken for the area ranger station, resulting in a lack of privacy for the resident.

The area ranger station is located near the Grand Loop Road behind the log residence. The station is small, has inadequate storage, display and working space, and has no restrooms. Visitor contact services cannot be adequately provided under these conditions, and rangers are often forced to find other locations to complete their paperwork. A garage exists near the ranger station, and while its use is intended to be associated with the log residence, it is used instead for the storage of visitor information, office supplies, and search and rescue equipment associated with the local ranger operation.

A number of maintenance functions, including construction and repair operations, are staged from the Tower government area. Equipment and supplies varying from garbage trucks to tools and paint cans are stored in the area. The existing maintenance building is too small to serve current and projected needs. There are no rest rooms, vehicle storage, meeting or break rooms available, and there is very limited office space and indoor storage. The staging area, while sufficient in size, is highly visible from the government housing area, as well as from portions of the Roosevelt Lodge area.

A fire cache is located to the south of the government area, near the existing bunkhouse. This building is too small to properly shelter the vehicles and equipment that need to be available in this area. Access to the structural fire vehicle is clumsy and unsafe when it is indoors, resulting in the vehicle being stored outside during the operative season.

The circulation system at Tower is not ideal, since heavy equipment must be driven through the residential area to reach the maintenance facilities. However, with maintenance-associated traffic being limited to early morning and late afternoon hours, current residents have adapted to this situation.

Finally, the existing facilities in the Tower area are highly visible from the Grand Loop Road. Efforts should be made to minimize the visual impacts of the area, for both existing and proposed construction.

The primary function of the Roosevelt Lodge area is to serve visitors and enhance their park experience. Therefore, visitor satisfaction must be strongly considered in evaluating the status of existing facilities.

An average of 169 people are employed by three different concessioners to serve visitors to the area. Fifty-three of these employees are housed two miles southeast, in the vicinity of Tower Fall. The remaining 116 employees are housed in cabins surrounding Roosevelt Lodge, with sometimes as many as four employees to a one-room cabin. Staffing projections indicate that a total of 136 employees would eventually require housing in the Roosevelt area. Currently, visitor and employee cabins are intermixed east and west of the Lodge. The differing schedules and interests of visitors and employees can lead to conflicts and an unsatisfying experience for all parties. Many of these cabins are in very poor condition and must be rehabilitated to meet basic health and safety standards. No existing residences or visitor cabins meet handicapped accessibility standards.

Neither the Tower government area nor the Roosevelt Lodge area are operational during the winter months, although a ranger does inhabit the current ranger residence year-round and is available for emergency services. The road from Mammoth Hot Springs to Cooke City passes through this area and is kept open throughout the winter. Several ski trails originate near Tower Junction, but no snowmobile activity originates here. In order to serve the needs of visitors and protect the resources of the park at this time of the year, ranger and maintenance services would need to be provided from winterized facilities at Tower Junction.

ALTERNATIVES

In the development of the community planning proposal for the Tower Junction area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the Tower Junction area were evaluated for their suitability to support employee housing and visitor support facilities. Of these areas, only Area "A" was considered to be unsuitable for new development, due to its high visibility from the Grand Loop Road. Area "B" was determined to be suitable for development if groundwater and corral operations concerns could be addressed. Areas "C" and "D" were considered most suitable for development. Concerns for the integrity of the Roosevelt Lodge Historic District limit the potential for development in Area "E". In addition to these general parameters, other site-specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required extensive new ground disturbance; required construction in flood-prone, wetland, steeply sloped, or utility areas; would not have retained selected historic structures; would have been visible from public roadways; or would have poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the Tower Junction area. Not all government employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Most employees who were housed in the Tower government area would continue to live in substandard mobile homes. The residence adjacent to the Grand Loop Road would continue to be mistaken for a ranger station, precluding any sense of privacy for its occupants. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Maintenance operations would continue to function from an inadequately-sized building. Equipment and supplies would continue to be stored improperly. The maintenance yard would continue to be visible from the employee housing area and from the visitor cabins in Roosevelt. The garage and fire cache would remain undersized, causing essential safety equipment, vehicles, and supplies to be improperly stored. A number of buildings and vehicles would continue to be visible to visitors passing by on the Grand Loop Road. Visitor and employee lodging would continue to be intermixed, and concessioner employees would continue to live in overcrowded housing. Employee housing and maintenance facilities would not be properly winterized.

The Proposal

This plan addresses the community needs identified for the Tower Junction area through redevelopment of selected areas in both the Tower government and Roosevelt Lodge areas, while retaining historic buildings and maintaining the integrity of the Roosevelt Lodge Historic District. Additional housing for government and concessioner employees would be added, maintenance and operational concerns would be addressed, and the visitor experience would be improved. All new construction would occur in previously disturbed areas. However, a small area of designated wetland would be disturbed for construction of the three new year-round houses in the government area.

Housing The projected needs for park employee housing would be met with this plan. Three new year-round quarters would be located in the Tower government area in a cluster among the trees nearest the Grand Loop Road. In addition, Building 241, currently used as seasonal shared housing, would be renovated as a year-round, single family home to meet the need for a total of four year-round quarters. The three new houses would not be more than one and one-half stories high. With the provision of four year round quarters, the residence nearest the Grand Loop Road could be eliminated as housing. New construction and rehabilitation would meet NPS housing design standards.

Twenty-five seasonal quarters would be provided in a combination of existing and newly constructed units. Twenty employees would be housed in one and one-half and two story units south of the year-round units, where mobile homes are currently located. The new construction would require careful phasing in the removal of existing mobile homes. The existing bunkhouse, building 238, would be remodeled as necessary to house five seasonal employees. This housing is intended to accommodate employees whose work is of a transient nature, such as researchers, trail crews and others. All newly constructed units would meet NPS housing design standards.

At Roosevelt, the cabins along Lost Lake Creek to the west of the lodge would be renovated and remodeled specifically for visitor use; concessioner employees would no longer be housed in this area. At the same time, visitor use would be eliminated from the cabins clustered to the east of the lodge. This area would be used solely to house concessioner employees. Four-plex cabins would be constructed on the bench below these existing cabins to provide an adequate quantity of employee housing. All new structures would be single story and architecturally compatible with the historic district. A total of 70 dormitory-style rooms would be available to concessioner employees, allowing area managers to have single rooms. All other employees would share housing, two per room.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

A new maintenance facility would be constructed at the south end of the government area, in the vicinity of the existing maintenance yard. The building would provide necessary vehicle, equipment, and supply storage, office space, rest rooms and meeting rooms. Functions taking place in the existing garage and fire cache would be accommodated within this new structure. Siting of the building would screen the maintenance yard and operations from the view of visitors in the Roosevelt Lodge area. Screening would be provided to buffer the maintenance yard from government employee housing.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be provided in the government area. The structure would be sited to the south of seasonal housing, and would act as a buffer between the residential and maintenance functions. For concessioner employees, a separate pub exists to the east of the lodge for recreational and social gatherings but is no longer adequate for current use.

Ranger Facilities

The log structure adjacent to the Grand Loop Road would be abandoned as a residence and converted to a ranger station. This building would be easily accessible and recognizable to visitors. The floor space available in this structure would provide private office space, adequate storage and display space, and visitor contact facilities.

Corrals

The Tower corral would be reduced in size to allow for the development of the year-round housing.

Fire Cache

Appropriate supply and vehicular storage facilities would be adequately provided within the new maintenance building.

Visitor Lodging

The quality of the visitor experience would be improved by moving concessioner employees out of the cabins west of the Roosevelt Lodge. In addition, screening of the maintenance facilities would lessen the visual impact of these facilities on visitors. Visitors could continue to use the trail up Lost Creek as a nearby recreational amenity.

Circulation

Existing circulation patterns would be retained.

Utilities

Water supplies and wastewater facilities would need to be expanded to serve the increased number of employees in the Tower and Roosevelt areas. The proposed development of the area would require the expansion and upgrade of both the Tower government and Roosevelt septic systems. After the upgrade of area systems, no capacity problems are anticipated.

Alternative One

This plan partially addresses the community needs identified for Tower Junction through redevelopment in the Tower government and Roosevelt Lodge areas and through relocation of corrals at both Tower and Roosevelt. All historic buildings would be retained and the Roosevelt Lodge Historic District would be maintained in its existing condition. Additional housing for year-round, seasonal, and concessioner employees would be added and maintenance and operational concerns would be addressed. New development would be very visible from the Grand Loop Road, in both the Tower area and the Roosevelt area. The majority of new construction would occur in previously disturbed areas. However, a large area of designated wetland would be disturbed for construction of the seasonal housing units.

Housing

The projected needs for park employee housing would be met with this plan. Three new one and one-half story year-round quarters would be located in the Tower government area in a cluster south of the trees nearest the Grand Loop Road. In addition, Building 241, currently used as seasonal shared housing, would be renovated as a year-round, single-family home, for a total of four year-round quarters. Careful phasing would be required in conjunction with the use of the existing mobile homes while the year-round houses are constructed and subsequently occupied. With the provision of these four year-round quarters, the residence nearest the Grand Loop Road could be eliminated as housing. New construction and rehabilitation would meet NPS housing design standards.

Twenty-five seasonal quarters would be provided in a combination of existing and newly constructed units. Twenty employees would be housed in one and one-half and two story units north of the year-round units, in an area near to and visible from the Grand Loop Road. The existing bunkhouse, Building 238, would be remodeled as necessary to house five seasonal employees. This housing would be used to accommodate employees whose work is of a transient nature, such as researchers, trail crews, and others. All newly constructed units would meet NPS housing design standards.

At Roosevelt, the cabins along Lost Lake Creek to the west of the lodge would be renovated and remodeled specifically for visitor use; concessioner employees would no longer be housed in this area. At the same time, visitor use would be eliminated from the cabins clustered to the east of the lodge; this area would be used solely to house concessioner employees. Two-story dormitory buildings would be added in a cluster in an area near to and visible from the Grand Loop Road to provide an adequate quantity of concessioner employee housing. A total of 70 dormitory-style rooms would be available to concessioner employees, allowing area managers to have single rooms. All other employees would share housing, two per room.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

A new maintenance facility would be constructed at the south end of the government area, in the vicinity of the existing maintenance yard. The building would provide necessary vehicle, equipment, and supply storage, office space, rest rooms, and meeting rooms. Functions taking place in the existing garage and fire cache would be accommodated within this new structure. Siting of the building would screen the maintenance yard and operations from the view of visitors in the Roosevelt Lodge area. Screening would be provided to buffer the maintenance yard from government employee housing.

Recreational Facilities

A very small area for outdoor recreation, with no community center, would be provided in the area between the maintenance facility and the year-round housing units. For concession employees, a separate pub exists to the east of the lodge for recreation and social gatherings.

Ranger Facilities

The log structure adjacent to the Grand Loop Road would be abandoned as a residence and converted to a ranger station. This building would be easily accessible and recognizable to visitors. The floor space available in this structure would provide private office space, adequate storage and display space, and visitor contact facilities.

Corrals

The existing Tower and Roosevelt corrals would have to be relocated to provide room for the new housing construction. The only areas considered available for such relocations have proven unworkable. The first, an area north of the Grand Loop Road has suitable terrain, but disturbance of native vegetation in a very visible area would be required. The second, an area by the main Roosevelt entry road, also has suitable terrain, but would be located directly over the Roosevelt septic system, which can not support such use.

Fire Cache Appropriate supply and vehicular storage facilities would be adequately provided within the new maintenance building.

Visitor Lodging The quality of the visitor experience would be improved by moving concessioner employees out of the cabins west of the Roosevelt Lodge. In addition, screening of the maintenance facilities would lessen the visual impact of these facilities on visitors. Visitors could continue to use the trail up Lost Creek as a nearby recreational amenity.

Circulation Existing circulation patterns would be retained.

Utilities Water supplies and wastewater facilities would need to be expanded to serve the increased number of employees in the Tower and Roosevelt areas. A new spring box adjacent to the existing source in the Tower area would be constructed. The proposed development of the area would require the expansion and upgrade of both the Tower government and Roosevelt Lodge septic systems. After the upgrade of area systems, no capacity problems are anticipated.

Alternative Two

This plan partially addresses the community needs identified for Tower Junction through redevelopment of selected areas in the Tower government area while leaving existing development in the Roosevelt Lodge area intact. All historic buildings would be retained and the Roosevelt Lodge Historic District would be maintained in its existing condition. Additional housing for year-round, seasonal, and concessioner employees would be added and maintenance and operational concerns would be addressed. New development in the Tower government area would be very visible from the Grand Loop Road. The majority of new construction would occur in previously disturbed areas. However, a large area of designated wetland would be disturbed for construction of the seasonal housing units and concessioner dormitories.

Housing The projected needs for Park employee housing would be met with this plan. Three new one and one-half story year-round quarter would be located in the Tower area in a cluster in the area where current maintenance operations are staged. While this location may offer these residents the most privacy, provision of access to these residences throughout the seasons would be more difficult than in other alternatives, due to the greater road length. In addition to these three new houses, Building 241, currently used as seasonal shared housing, would be renovated as a year-round, single-family home. With the provision of these four year-round houses, the residence nearest the Grand Loop Road could be eliminated as housing. New construction and rehabilitation would meet NPS housing design standards.

Twenty-five seasonal quarters would be provided in a combination of existing and newly constructed units. Twenty employees would be housed in one and two story units north of the year-round units, in an area somewhat visible from the Grand Loop Road. Careful phasing in conjunction with the use of the existing mobile homes would be needed while the seasonal quarters are constructed. In addition, the existing bunkhouse, Building 238, would be remodeled as necessary to house five seasonal employees. This housing would be used to accommodate employees whose work is of a transient nature, such as researchers, trail crews, and others. All newly constructed units would meet NPS housing design standards.

At Roosevelt, the cabins along Lost Lake Creek to the west of the lodge would be renovated and remodeled specifically for visitor use; concessioner employees would no longer be housed in this area. At the same time, visitor use would be eliminated from the cabins clustered to the east of the lodge; this area would be used solely to house concessioner employees. Two-story dormitory buildings would be added in a cluster west of the new seasonal quarters, in an area highly visible from the Grand Loop Road, to provide an adequate quantity of concessioner employee housing. A total of 70 dormitory-style rooms would be available to concessioner employees, allowing area managers to have single rooms. All other employees would share housing, two per room.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

A new maintenance facility would be constructed in an area near the Grand Loop Road. This location would be the most convenient for daily maintenance operations. In addition, vehicles would not have to drive through the residential areas. However, this location would be very visible from the Grand Loop Road, the existing and new spring boxes would have to be incorporated into this construction, and wetland areas would be disturbed. The building would provide necessary vehicle, equipment, and supply storage, office space, rest rooms and meeting rooms. Functions taking place in the existing garage and fire cache would be accommodated within this new structure.

Recreational Facilities

A very small area for outdoor recreation, with no community center, would be provided in the area between the seasonal and the year-round housing units. For concession employees, a separate pub exists to the east of the lodge for recreation and social gatherings but is no longer adequate for current use. .

Ranger Facilities

The log structure adjacent to the Grand Loop Road would be abandoned as a residence and converted to a ranger station. This building would be easily accessible and recognizable to visitors. The floor space available in this structure would provide private office space, adequate storage and display space, and visitor contact facilities.

Corrals

The existing Tower corral would be substantially reduced in size in order to provide sufficient room for the concessioner housing.

Fire Cache

Appropriate supply and vehicular storage facilities would be adequately provided within the new maintenance building.

Visitor Lodging

The quality of the visitor experience would be improved by moving concessioner employees out of the cabins west of the Roosevelt Lodge. In addition, screening of the maintenance facilities would lessen the visual impact of these facilities on visitors. Visitors could continue to use the trail up Lost Creek as a nearby recreational amenity.

Circulation

Existing circulation patterns in Roosevelt would not be changed. As noted above, circulation in Tower would be revised, with maintenance operations closer to the Grand Loop Road and year-round housing further removed from the road.

Utilities

Water supplies and wastewater treatment facilities would need to be expanded to serve the increased number of employees in the Tower and Roosevelt areas. A new spring box adjacent to the existing water source in the Tower area would be constructed. The proposed development of the area would require the expansion and upgrade of both the Tower government and Roosevelt Lodge septic systems. After the upgrade of area systems, no capacity problems are anticipated.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

Soils in the Tower Junction area were deposited on alluvial fans or glacial-fluvial kames. The rock fragments in the soil are andesite and rhyolite tuff. In general, soil texture is loam at the surface with a subsoil of sandy loam or loamy sand. Gravels make up 50 percent of the Tower government area and comprise 20 to 40 percent of the soil profile in the Roosevelt Lodge area. A few boulders and some cobbles are present. Depth to bedrock is greater than ten feet. The surface soil is ten inches thick and has a neutral pH in the Tower government area and a slightly acid pH in the Roosevelt Lodge area. The area slopes gently to the north at a gradient of 5 to 8 percent. The soils are well-drained with moderate fertility and have a moderate erosion potential; the mass movement potential is low. An old stream channel runs through the Tower government area. Most of the soils in the developed areas have been altered by human activity.

Seismic activity in the area is monitored. The 100-year earthquake occurrence is estimated to be a magnitude of 6.0 on the Richter scale.

Radon readings taken during 1989 and 1990 in surrounding residences ranged from 0.5 to 1.73 picocuries/liter. This suggests that the radon contamination potential in the area is low.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 1.4 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing the erosion potential.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

The old stream channel that flows through the Tower government area may add to runoff and drainage problems. Additional soil surveys in this area would be done prior to construction.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction in order to determine whether mitigation measures are necessary.

Alternative One
Under Alternative One, construction would disturb 1.9 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two
Construction would disturb 1.5 acres. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

The Tower/Roosevelt area considered for development is comprised of three different vegetation types. The forested slopes to the south/southeast extending out beyond the Roosevelt Lodge and into the visitor cabins area is classified as PSME/SYAL habitat type with a DF2 cover type. The overstory is dominated by Douglas fir intermingled with occasional lodgepole pine and aspen. Douglas fir and lodgepole pine seedlings and saplings exist in the understory. The herbaceous stratum is dominated by common snowberry, pinegrass, Idaho bentgrass, prickly rose, Oregon grape, shiny-leaf spirea, and western serviceberry. The vegetation is typical of drier, lower-elevation slopes.

Non-forested areas to the northeast are described as the ARTR/FEID habitat type. The herbaceous strata is dominated by the shrubs big sagebrush and common rabbitbrush; by the forbs rosy pussytoes, sulphur buckwheat, and silky lupine; and by the graminoids Idaho fescue, mutton grass, prairie junegrass, and needle-and-thread grass. The site is typical of a dry, upland sagebrush/grassland community.

The basin to the west, in the area of the National Park Service ranger, maintenance, and housing facilities, is described as a wet PIEN/GATR habitat type with a mixed forest cover type. The overstory is a mixture of lodgepole pine, Engelmann spruce, and aspen. Understory vegetation includes Engelmann spruce, aspen, and willow. If the vegetation were to persist though time, Engelmann spruce would probably become the canopy dominant. The herbaceous layer is dominated by the shrubs prickly rose and willow; by the forbs white geranium, cow parsnip, butterweed groundsel, black-tipped butterweed, bedstraw, yarrow, fireweed, and elk thistle; and by the graminoids muricate sedge, fringed brome, bluejoint reedgrass, Idaho bentgrass, and giant wild rye. Exotic species present include Canada thistle, sheep sorrel, and timothy. The landform under consideration is an alluvial fan/outwash plain which is influenced by Lost Creek to the southeast, a surface spring to the southwest, and a runoff channel to the south. There are also relict stream channels flowing downslope throughout the area. The site was occasionally flooded and had braided intermittent stream channels during undisturbed times. As such, construction at the site has influenced groundwater hydrology, soil development, and the plant communities. Wetland indicators of the above criteria are evident, resulting in designation of this habitat type as a wetland. No sensitive, threatened, or endangered plant species were found in the area.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short-term but would in time result in continued deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 1.4 acres. Some lodgepole pines would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the hazard tree potential. Grasses and other vegetation would also be disturbed or removed.

There are portions of the proposed area of disturbance where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

Overall, impacts to vegetation would be minor in the short-term, but continued deterioration of vegetation would occur over time in the developed areas.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more naturalistic condition. Seeds and transplants collected from construction areas prior to development would be used for revegetation. The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One

Under Alternative One, construction would disturb 1.9 acres. The types of impacts would be similar to those described for the proposed action.

Alternative Two

Under Alternative Two, construction would disturb 1.5 acres. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

Wildlife which inhabit the Tower Junction area include elk, deer, moose, pronghorn, black and grizzly bears, cougars, coyotes, and small mammals such as ground squirrels, pocket gophers, and jackrabbits. Bison, in particular, are commonly seen in or around the Tower Junction developed area.

Birds using this general area of the park are typical forest and sagebrush/meadow species including Swainson's hawk, red-tailed hawk, American kestrel, great gray owl and other small owl species, ruby-crowned kinglet, Cassin's finch, red-breasted nuthatch, yellow-rumped warbler, Clark's nutcracker, Northern flicker, raven, Williamson's sapsucker, and dark-eyed junco. A red-tailed hawk nest is located in the development near the Roosevelt Lodge.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Amphibian species in the vicinity of the project area include the tiger salamander and possibly the boreal toad, striped chorus frog, and Western spotted frog. Reptile species include the wandering garter snake and the rubber boa.

Environmental Consequences

No-Action Alternative

Under this alternative, there would be no increased impacts on wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 1.4 acres of wildlife habitat, some of which is currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts to amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the Proposal, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer and moose. Alternative One would disturb approximately 1.9 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the Proposal, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer and moose. Alternative Two would disturb approximately 1.5 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

Portions of the area of current use and proposed development in the Tower Junction area are located in the valley of Lost Creek. Lost Creek is undersized relative to its valley width. Some channel shifting over long periods has occurred but its present location along the east side of the valley appears to be stable.

In the early 1980's, a flood occurred in Lost Lake Creek, a small tributary to Lost Creek. This flood resulted from the failure of a beaver dam upstream, and it inundated the valley and existing structures. A levee was constructed along Lost Lake Creek to prevent future high flows from inflicting similar damage. The levee is composed of unsorted material scraped from the adjacent area and ranges in height from 12 feet above the channel bottom near the confluence to two feet in height at its upper extent. The levee is not feathered into the hillside at the upper end and is susceptible to breaching at this point. Such an occurrence would direct water down the alluvial fan and into the developed area.

Floodplain analysis suggests that the channel can contain a flow of approximately 700 cubic feet per second. The recurrence interval of a flood which would overtop the banks of Lost Creek is estimated as once every 1,000 years.

A wetlands inventory of this area has been completed. There are numerous small wetland sedge meadows, and substantial areas of bluejoint reedgrass, which marginally meet the definition of a wetland.

Environmental Consequences

No-Action Alternative

There would be no additional impacts to wetlands under this alternative. Development would continue to be susceptible to flooding should the Lost Lake Creek levee be breached.

The Proposal

Under the proposed action, the Lost Lake Creek levee would be improved to lessen the potential for breaching. All development would be out of the 100- or 500-year floodplain of Lost Creek.

Approximately 0.6 acres of designated wetlands would be disturbed for construction of three new year-round houses. Wetland restoration or mitigation actions would be undertaken in compliance with Section 404 regulations relating to wetland and NPS guidelines. Other wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative One

The effects of Alternative One would be very similar to those described under the proposed action. However, 1.9 acres of designated wetlands would be disturbed for construction of the seasonal housing units. Wetland restoration or mitigation actions would be undertaken in compliance with Section 404 regulations relating to wetland and NPS guidelines. Other wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that wetlands could be directly or indirectly impacted.

Alternative Two

The effects of Alternative Two would be very similar to those described under the proposed action. However, 1.5 acres of designated wetlands would be disturbed for construction of the seasonal and concessioner housing units and the maintenance building. Wetland restoration or mitigation actions would be undertaken in compliance with Section 404 regulations relating to wetland and NPS guidelines. Other wetlands adjacent to construction areas would be protected during the construction phase. The slight increase in people living near the wetlands could increase the potential that wetlands could be directly or indirectly impacted.

WATER QUALITY

Affected Environment

The Tower government area is situated on highly permeable alluvial fan deposits at the mouth of a relatively narrow valley. The confluence of Lost Creek and Lost Lake Creek is at the upper (southeast) end of this valley. Lost Creek is a perennial stream that flows north past the government housing area, and passes through a culvert under the Grand Loop Road. In addition, the meadows west of the Tower government area abound with seeps and springs.

The domestic water supply for the Tower government area and the Roosevelt Lodge area is obtained from a spring box adjacent to the ranger station. Water quality is good, but requires additional treatment. There is currently an adequate water supply for the existing developed area. Storage for the Tower Junction area is 200,000 gallons. However, any further development of the Tower Junction area would require the expansion and upgrading of the existing domestic water source.

The Tower government area wastewater treatment is a septic tank and disposal system located north of the highway. This system is currently adequate. The Roosevelt Lodge area sewer system is a cesspool and requires replacement. Any further development of the Tower Junction area would require the expansion and upgrading of the existing systems.

Environmental Consequences

No-Action Alternative

Operations at Tower Junction would continue to present potential sources of surface and groundwater pollution from road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program to replace leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any old or leaking tanks will be replaced within the parameters of this program.

The domestic water supply is good, but requires additional treatment measures to meet current regulations. The Roosevelt Lodge sewage system would require replacement in the immediate future.

The Proposal
The proximity of the developed area to Lost Creek suggests a high potential for surface water contamination, particularly from increased sedimentation occurring during construction. To prevent this type of pollution in Lost Creek, construction equipment would be kept away from the stream banks. This would assure that there would be no crushing of the stream banks or removal of vegetation which hold the stream banks, and no material would be pushed into the stream.

Alluvial fans are highly permeable and the potential for groundwater pollution is high. A new maintenance facility is proposed south of the housing area. The use, storage, and disposal of inorganic materials associated with a maintenance facility could increase the potential for pollution of the groundwater.

The capacity of the Tower Junction domestic water supply would not be sufficient for all of the proposed development. A greater capacity must be developed or a new source of water located. Any further development of the Tower Junction area would require the expansion and upgrading of the existing wastewater systems.

Construction activities would result in minor impacts to surface and groundwater sources and to wet meadow areas. Potential sources of impacts include increased stream sedimentation due to routine road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas.

All development would be located away from Lost Creek and Lost Lake Creek. With proper construction techniques, no significant impact to the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects on the area's water resources.

Alternative One
Development activities would be similar to those described for the proposed action. However, this alternative would locate both the government and horse corrals over the Tower/Roosevelt area septic systems which would render the site unsuitable for sewage treatment. Overall impacts would be minor and would not result in any effects on the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action. However, a new maintenance facility is proposed for placement in the midst of the meadows on the west side of the area. The location of this facility approximately 350 feet up gradient from the existing domestic water supply could violate the Safe Drinking Water Act. Overall impacts could be major and could adversely affect the area's water resources.

FISHERIES

Affected Environment

Lost Creek and Lost Lake Creek have not been surveyed for fisheries. However, angling reports on Lost Creek indicate non-native brook trout are present.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts to the fisheries.

The Proposal

Impacts to fisheries from potential runoff of petroleum and chemical products from roads and parking areas are unknown. Lost Creek and Lost Lake Creek would be surveyed prior to construction. However, it is expected that overall impacts to the fisheries would be minor, and there would be no significant short- or long-term effects upon fish populations.

Alternative One

Impacts to fish populations would be similar to those described for the Proposal. Under Alternative One, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to fish populations would be similar to those described for the Proposal. Under Alternative Two, overall impacts to fish populations would be minor, and there would be no significant short- or long-term effects.

AIR QUALITY

Affected Environment

Air quality within the Tower Junction area is generally excellent, with occasional periods of degradation caused by regional haze or forest fire smoke. Localized emissions from wood burning stoves, campfires, and motor vehicles are sometimes visible in the immediate area during temperature inversions.

An air quality monitoring station is located at the Tower Ranger Station where acid precipitation is monitored. The closest other air quality monitoring station is south at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes due to construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects would not occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One would not occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two would not occur in measurable quantities.

VISUAL QUALITY

Affected Environment

By virtue of its location, development in the Tower Junction area has great potential to be visually obtrusive, yet the architectural styles of permanent structures in the area have facilitated a minimum impact on the natural surroundings. In planning for future development, screening and design styles would be carefully considered.

The landscape surrounding the Tower Junction area illustrates a transition from densely forested hills to a glacially formed shrubland valley. Both the Roosevelt Lodge area and the Tower government area are nestled at the base of these hills, screened from view from the Grand Loop Road only by the forest edge and by local topography.

The Grand Loop Road descends from the west into this valley. From vantage points along this corridor, the Tower government area is highly visible. The ranger residence, the pumphouse, and the ranger station are adjacent to the road and are visually dominant, but the rustic design of these buildings allows them to blend with the natural landscape. However, other housing and maintenance structures further up the drainage are visible through the sparse existing tree cover; while the barn, corral, and other older structures are rustic in design, the visual character of the site is compromised by the mobile homes and recreational vehicles used for housing.

The Roosevelt Lodge area is largely screened from the Grand Loop Road by changes in topography and stands of aspen, Douglas fir, and lodgepole pine. The concession corral operation is adjacent to the Tower Fall Road, but its rustic character and "Old West" flavor blend with the surrounding environment. The road leading to Roosevelt Lodge ascends a small hill from the sagebrush flats and grasslands to the fringe of the forest. The size of the lodge makes it visually dominant in this area, yet the log design adds to the rustic atmosphere, as do the associated one-room cabins. These structures are situated among large evergreen trees, which help blend the cabins into the natural surroundings. From the guest cabins west of the lodge, there are views of the government maintenance area and the back of the employee housing area; these views are incongruous with the natural setting and the national park feeling.

Environmental Consequences

No-Action Alternative

There would be no increased effects on visual quality.

The Proposal

The maintenance building would be screened from view from the employee housing area and from visitors in the Roosevelt Lodge area. Removal of the existing mobile homes would improve the aesthetic appearance of the area. Nighttime light pollution from the area would increase.

Alternative One

New developments, including government and concessioner housing, horse corrals and barns, and a parking lot would be very visible from the Grand Loop Road.

Alternative Two

The seasonal government housing and concessioner housing, as well as the maintenance building, would be very visible from the Grand Loop Road.

CULTURAL RESOURCES

Affected Environment

The proposed project would be located in and adjacent to the Tower government area and within the Roosevelt Lodge Historic District. There are a number of significant cultural resources in the Tower/Roosevelt area that have the potential to be affected by the proposed project. Archeological resources have been found, but the majority of the known resources are historic structures associated with the development of the concessions and National Park Service administrative activities. Many of the historic structures continue to be utilized by the concessioner and the National Park Service.

Tower Government Area

Intensive archeological surveys conducted in the Tower government area, in accordance with Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, located no archeological resources. There is one historic archeological site between Roosevelt and Tower which has been identified (Cannon, 1990). A formal determination of eligibility to the National Register, in consultation with the Wyoming State Historic Preservation Office, is needed.

The first administrative development in the Tower area occurred in 1908 with construction of the Tower Soldier Station by the military. In 1916 the National Park Service assumed administrative responsibility for national parks, and in 1925 the soldier station was modified for use as a ranger station.

Most of the other 11 permanent structures in the Tower government area were built in the 1930s to facilitate concessioner and park administrative activities in the area. The majority of these structures are still in use today. Currently, there are 11 structures in the Tower area on the List of Classified Structures (LCS). Ten of these buildings (shop, #63; bunkhouse, #238; garage, #239; fire cache, #240; ranger station/residence, #241; horse barn, #245; employee laundry, #246; gas house, #263; Hamilton's dormitory, #6104; and storage building, no number) have not had eligibility to the National Register determined. The dormitory/old messhouse, #242, was determined ineligible to the National Register on July 21, 1986. Unlike the buildings at Roosevelt, the buildings at Tower do not comprise a historic district. Structures which have not been evaluated for eligibility to the National Register would be treated as if they were eligible.

Today, the Tower area continues to function in the capacity for which it was originally developed, park administrative activities.

Roosevelt Lodge Area

Intensive archeological surveys conducted in the Roosevelt Lodge area, in accordance with Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, recorded two prehistoric lithic scatters (Cannon and Phillips 1991). A formal determination of eligibility to the National Register, in consultation with the Wyoming State Historic Preservation Office, is needed.

A significant aspect of the Roosevelt area is the Roosevelt Lodge Historic District. This historic district contributes to the park's nationally significant role in the development of the National Park Service. Historically, Roosevelt Lodge figured prominently in outdoor education and the development of concessions in the park.

The Wylie Permanent Camping Company had established a tent camp, "Camp Roosevelt," at Roosevelt by 1904. "Camp Roosevelt" was replaced by 1920, with the opening of Roosevelt Lodge. The lodge was built by the Yellowstone Park Company to serve the automobile traveler. It was the first lodge built in the park and it served to augment the hotel system. Over the years, additional structures were added, moved, and taken down in the Roosevelt area. In the 1982 National Register nomination, Culpin stated:

> "Historically, the Roosevelt Lodge area has been the scene of periodic construction, relocation, and removal of cabins according to accommodation needs and in some cases, changes in river course. However, the district retains its architectural and historical integrity."

The Roosevelt Lodge and its surrounding cabins and service buildings are all within the Roosevelt Lodge Historic District. The lodge retains its historical integrity and its use today is the same as it was when first built. The architectural integrity of the lodge is retained only in the front portion (both interior and exterior) of the building (reception and dining room). Other sections of the building have been modified over the years and are no longer architecturally intact.

In 1982, 124 buildings were listed in the National Register nomination as contributing to the historic district, with six non-contributing buildings. While the majority of the buildings in the Roosevelt area are historic, many were not originally constructed on site. Roosevelt has served as a repository for historic cabins that have been moved from elsewhere in the park. Individually, many of the buildings at Roosevelt do not qualify for the National Register, but collectively they contribute to the historic district. The majority of the buildings that are eligible or are listed on the National Register have been evaluated for exterior significance only.

The buildings eligible for the National Register include: the Roosevelt Lodge (# 6130), double comfort station (# 6131-6133), powerhouse (# 6134), housekeeping office (# 6138), caretaker's cabin (# 6140), tourist single cabin (# 6144), Hamilton's mini-store (# 6151), employee cabin (#7029), employee cabin (# 7031, 7032), tourist single cabins (# 7183-7222, 40 total), double comfort stations (# 7223-7226, 4 total), tourist single cabins (# 7227-7238, 12 total), tourist cabins (# 7240-7278, 39 total), log employee cabins (# 7279-7283, 5 total), storage building (# 7284), employee duplex cabin (# 7300), and tourist single cabins (# 7332, 7602).

Buildings ineligible for the National Register include: storage shed (# 6135), commissary shed (# 6136), ice house (# 7034), and shed (# 7035).

Buildings not evaluated for eligibility include: fire hose house (# 7028), horse barn (# 7030), tack shed (# 7033), and 10 cabins moved to Roosevelt from Old Faithful (# 7456, 7457, 7463, 7467, 7523, 7529, 7531, 7532, 7534, 7567). Buildings not evaluated would be treated as if they were eligible to the National Register.

Environmental Consequences

The archeological site recorded between Tower and Roosevelt is a historic site tied to the military presence at Tower (Cannon and Phillips 1991). It should not be affected by proposed development.

If the two archeological sites at Roosevelt, or the site between Tower and Roosevelt, could not be avoided, they would be evaluated for the National Register of Historic Places. If they were determined eligible, a data recovery plan would be developed. The Wyoming State Historic Preservation Office would be afforded an opportunity to comment on the plan.

If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS Regional Office and the Wyoming State Historic Preservation Office.

The Roosevelt Historic District and the historic structures at Tower would be affected by the proposed project. Under the proposal, contributing structures to the Roosevelt Historic District would be relocated within the district. New construction within the Roosevelt Historic District and in an area adjacent to the historic structures at Tower is also planned. The rehabilitation of historic structures, as well as new construction, would be completed in conformance with the requirements of the Secretary of the Interior Standards for rehabilitation. Prior to the relocation of contributing property, the Wyoming State Historic Preservation Office would be afforded an opportunity to comment on the proposed relocation. If the Wyoming SHPO objected to the relocation and this objection could not be resolved, the National Park Service would initiate consultation with the Advisory Council on Historic Preservation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The Roosevelt Lodge Historic district is located within the Tower Junction area. This area is unique in its rustic architecture, atmosphere, and "Old West" experience. Guests stay in log cabins and dine at the Roosevelt Lodge, a stone and log structure. A concessioner offers wrangler-guided horse trail rides and cookouts. Visitors can also access hiking and horse trails from this area.

Guest and concession employee cabins are intermingled. Pedestrian and vehicular traffic create congestion and disarray in an area where visitors expect to find quiet and a more natural setting. Conflicts occasionally arise between visitors and employees.

The government area is located about 1/8 mile to the west of the historic district. Visitors obtain information, permits, and emergency services at the ranger station. Government housing is located in this area.

During winter months, the road is plowed between Mammoth and Tower and between Tower Junction and Cooke City, Montana. Groomed ski trails are accessed from the Tower area. Concession facilities are not in operation, although emergency facilities and restrooms remain accessible.

It is possible that the physical condition of the housing area may affect visitor use by creating an adverse visual impact.

Environmental Consequences

No-Action Alternative

Under this alternative, visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter months would be very limited. Visitor services could be adversely affected due to low NPS employee morale. Visitor and employee cabins would continue to be intermingled, lessening the quality of the visitor experience.

The Proposal

The separation of concession employee residences and guest cabins would reduce conflicts between employees and visitors.

Quick and easy public access would be facilitated by converting the ranger residence (the building closest to the Grand Loop Road) to a visitor contact station.

During the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short- term effect. More employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE AND CONCESSIONER OPERATIONS

Affected Environment

The National Park Service (NPS) administers their maintenance operations, interpretation, visitor services, protection, and emergency services for the Tower Subdistrict from this area. Tower Junction is strategically located to provide acceptable response time to emergency situations west, east, and south of the area. The NPS operates a ranger station, maintenance facilities, and water and sewage treatment facilities at Tower Junction and a campground near Tower Falls. NPS employee quarters consist of 2 residences, 1 bunkhouse and 5 mobile homes. The quarters are located in the government housing area. During peak season, the NPS employs an average of 19 employees at Tower.

Concessioner facilities in the Roosevelt area are provided by Hamilton Stores, Inc. (HSI), TW Recreational Services, Inc. (TWRS), and Yellowstone Park Service Stations (YPSS).

HAMILTON STORES INC.

Hamilton Stores operates one store adjacent to the Roosevelt Lodge (open from early June until early September) and one store at Tower Falls (open from late May until mid September). The Roosevelt Store is located in the midst of visitor services and lodging, while the store at Tower Fall is completely removed from the Tower Junction area.

During peak season, HSI employs an average of 53 staff in this area. Only two employees are housed in the Tower/Roosevelt area, living in the store.

Hamilton Stores has 5 mobile home sites (2 employees each) and a dormitory which houses 41 employees located at Tower Falls. Most employees are transported to Roosevelt by a shuttle service provided by HSI.

Traditionally, the majority of HSI employees have been over 50 years of age. These employees prefer private housing arrangements, either in mobile homes, adult dormitories or apartments. Given the current limited availability of mobile home sites and dormitory rooms for couples, Hamilton Stores has requested an additional 5 mobile home sites (2 employees each) in the Tower Falls area to better accommodate their older work force.

TW RECREATION SERVICES

In the Roosevelt area, TWRS operates a full service lodging facility with cabins, dining room, corral operation, and gift shop (open from early June until early September). All facilities are centered around the Roosevelt Lodge.

During peak season, TWRS employs approximately 112 staff in the Roosevelt area. These employees are currently housed in Roosevelt cabins, with anywhere from 1-4 employees per cabin. These cabins are intermingled with guest facilities and there are often conflicts of noise and traffic congestion, resulting in decreased quality of the visitor experience.

TW Recreational Services employment opportunities are labor intensive seasonal jobs: maid service, groundskeeping, table service, and kitchen help. This type of work generally appeals to a younger segment of the work force, those who are students or are at the beginning of their careers. These employees are usually satisfied with dormitory living.

TW Recreational Services has traditionally experienced a high rate of employee turnover. This dynamic work force requires TWRS to constantly hire new employees, sometimes resulting in a temporary over-staffing.

In order to absorb flexible staffing levels, and to improve the visitor experience in the Roosevelt area, TWRS has requested the addition of 65 dormitory rooms (both double and single occupancy) in a location removed from the guest cabin area.

YELLOWSTONE PARK SERVICE STATIONS

Yellowstone Park Service Stations operates one service station in the Tower area (open from early June until early September). This facility is removed from the Roosevelt and Tower government housing areas, but is directly adjacent to the Grand Loop Road at the road junction.

During peak season, YPSS employs an average of 4 staff, all of whom are housed in TWRS cabins at Roosevelt.

The majority of YPSS seasonal positions are labor intensive, typically performed by employees in their late teens through their twenties.

In an effort to remove their employees from the TWRS guest cabin area, YPSS has requested either 3 mobile home sites or 3 dormitory rooms.

Environmental Consequences

No-Action Alternative

The No-Action Alternative would have no immediate adverse impacts on the NPS or concessioner operations in the Tower/Roosevelt area. However, in the long-term, if housing needs are not met, the result could be further overcrowding and employee dissatisfaction. This could create an adverse impact on hiring ability of the NPS and concessioner and, therefore, on their operations.

The Proposal

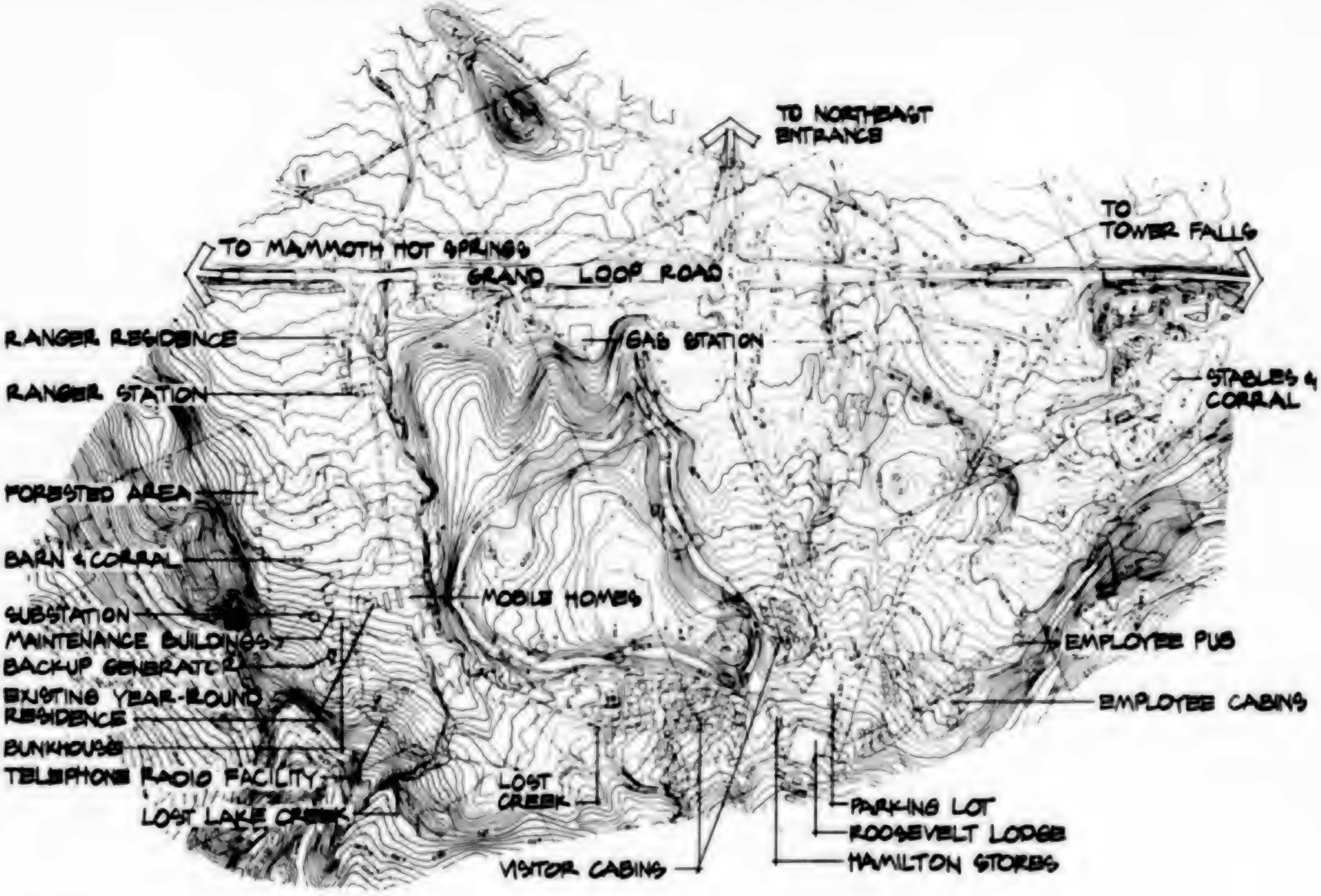
The proposal meets the NPS and concessioner's program requirements for housing. Constructing new housing units for employees would improve employee morale by providing better housing with increased privacy and additional living and storage space, and by alleviating overcrowding. Recreation and community facilities would be improved. These facilities could contribute to job efficiency and improve staff recruitment and retention. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents and visitors during the construction phase. This would only be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

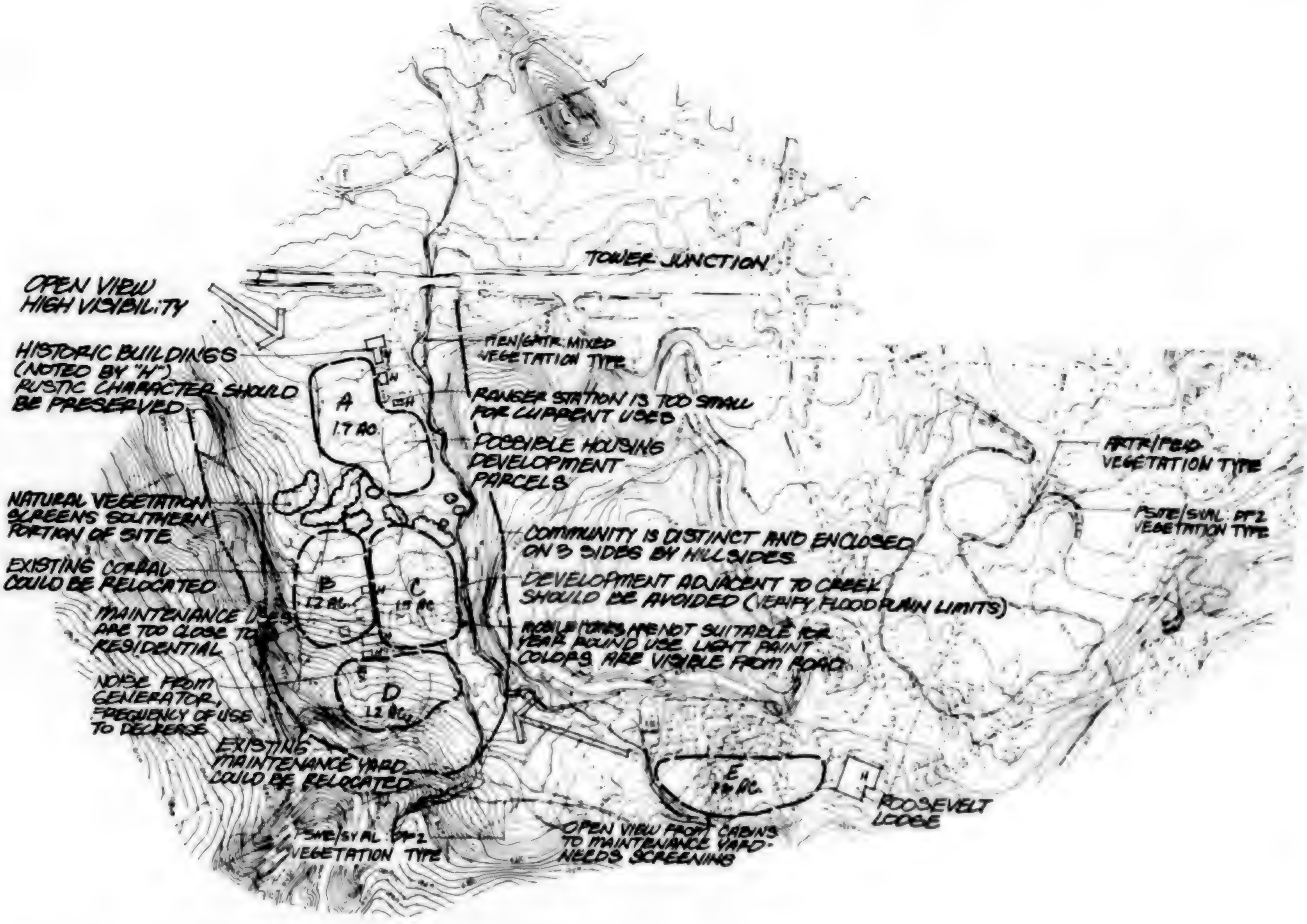


EXISTING CONDITIONS

YELLOWSTONE NATIONAL PARK

Tower Junction (Tower Government Area and Roosevelt Lodge)

101 / 40306 / May 92


TOWER JUNCTION
OPEN VIEW HIGH VISIBILITY
HISTORIC BUILDINGS (NOTED BY "H") RUSTIC CHARACTER SHOULD BE PRESERVED
PIEN/GATR: MIXED VEGETATION TYPE
RANGER STATION IS TOO SMALL FOR CURRENT USES
POSSIBLE HOUSING DEVELOPMENT PARCELS
A
1.7 AC.
NATURAL VEGETATION SCREENS SOUTHERN PORTION OF SITE
EXISTING CORRAL COULD BE RELOCATED
COMMUNITY IS DISTINCT AND ENCLOSED ON 3 SIDES BY HILLSIDES
B
1.2 AC.
C
1.5 AC.
DEVELOPMENT ADJACENT TO CREEK SHOULD BE AVOIDED (VERIFY FLOOD PLAIN LIMITS)
MAINTENANCE USES ARE TOO CLOSE TO RESIDENTIAL
MOBILE HOMES ARE NOT SUITABLE FOR YEAR ROUND USE. LIGHT PAINT COLORS ARE VISIBLE FROM ROAD
ARTR/FEID VEGETATION TYPE
PSME/SYAL: PP2 VEGETATION TYPE
NOISE FROM GENERATOR, FREQUENCY OF USE TO DECREASE
D
1.2 AC.
EXISTING MAINTENANCE YARD COULD BE RELOCATED
E
ROOSEVELT LODGE
PSME/SYAL: PP2 VEGETATION TYPE
OPEN VIEW FROM CABINS TO MAINTENANCE YARD NEEDS SCREENING
H

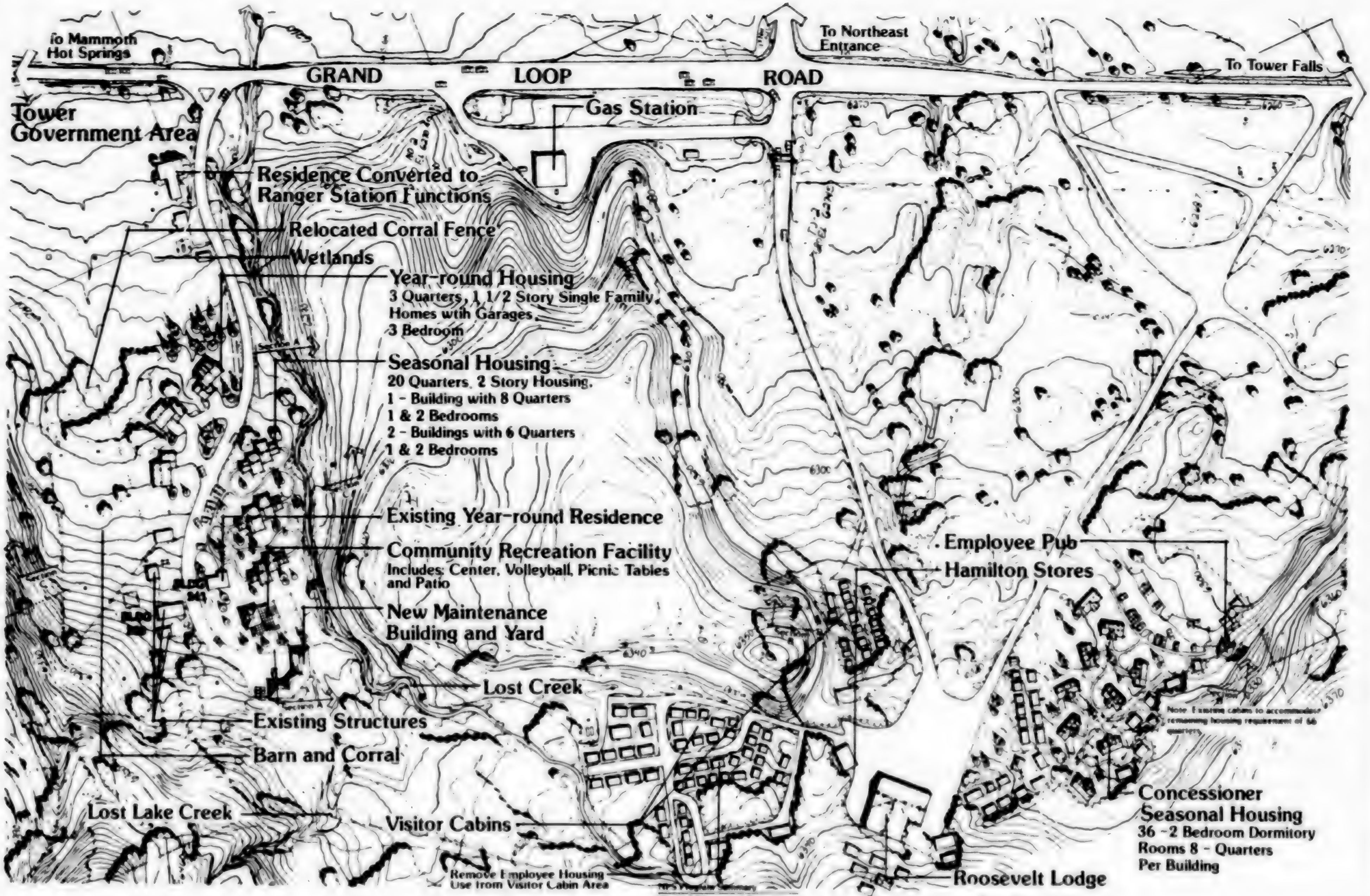
AREAS CONSIDERED FOR DEVELOPMENT

YELLOWSTONE NATIONAL PARK

Tower Junction (Tower Government Area & Roosevelt lodge)

101 / 40307 / May 92

NORTH


To Mammoth Hot Springs
GRAND
LOOP
ROAD
To Northeast Entrance
To Tower Falls
Tower Government Area
Gas Station
Residence Converted to Ranger Station Functions
Relocated Corral Fence
Wetlands
Year-round Housing
3 Quarters, 1 1/2 Story Single Family Homes wtih Garages, 3 Bedroom
Seasonal Housing
20 Quarters, 2 Story Housing,
1 - Building with 8 Quarters
1 & 2 Bedrooms
2 - Buildings with 6 Quarters
1 & 2 Bedrooms
Existing Year-round Residence
Community Recreation Facility
Includes: Center, Volleyball, Picnic Tables and Patio
New Maintenance Building and Yard
Lost Creek
Existing Structures
Barn and Corral
Lost Lake Creek
Visitor Cabins
Remove Employee Housing Use from Visitor Cabin Area
Employee Pub
Hamilton Stores
Note: Existing cabins to accommodate remaining housing requirement of 66 quarters.
Concessioner Seasonal Housing
36 - 2 Bedroom Dormitory Rooms 8 - Quarters Per Building
Roosevelt Lodge
Roosevelt Lodge Area
6300
6340
6370

NPS Program Summary

Retain 1 Year-round Quarters
Retain 5 Seasonal Quarters
Construct 3 Year-round Quarters
Construct 20 Seasonal Quarters

Concessioner Program Summary

Retain 66 Concessioner Quarters
Construct 70 Concessioner Quarters

Note: 67 Dorm Quarters for TWRS
3 Dorm Quarters For YPSS

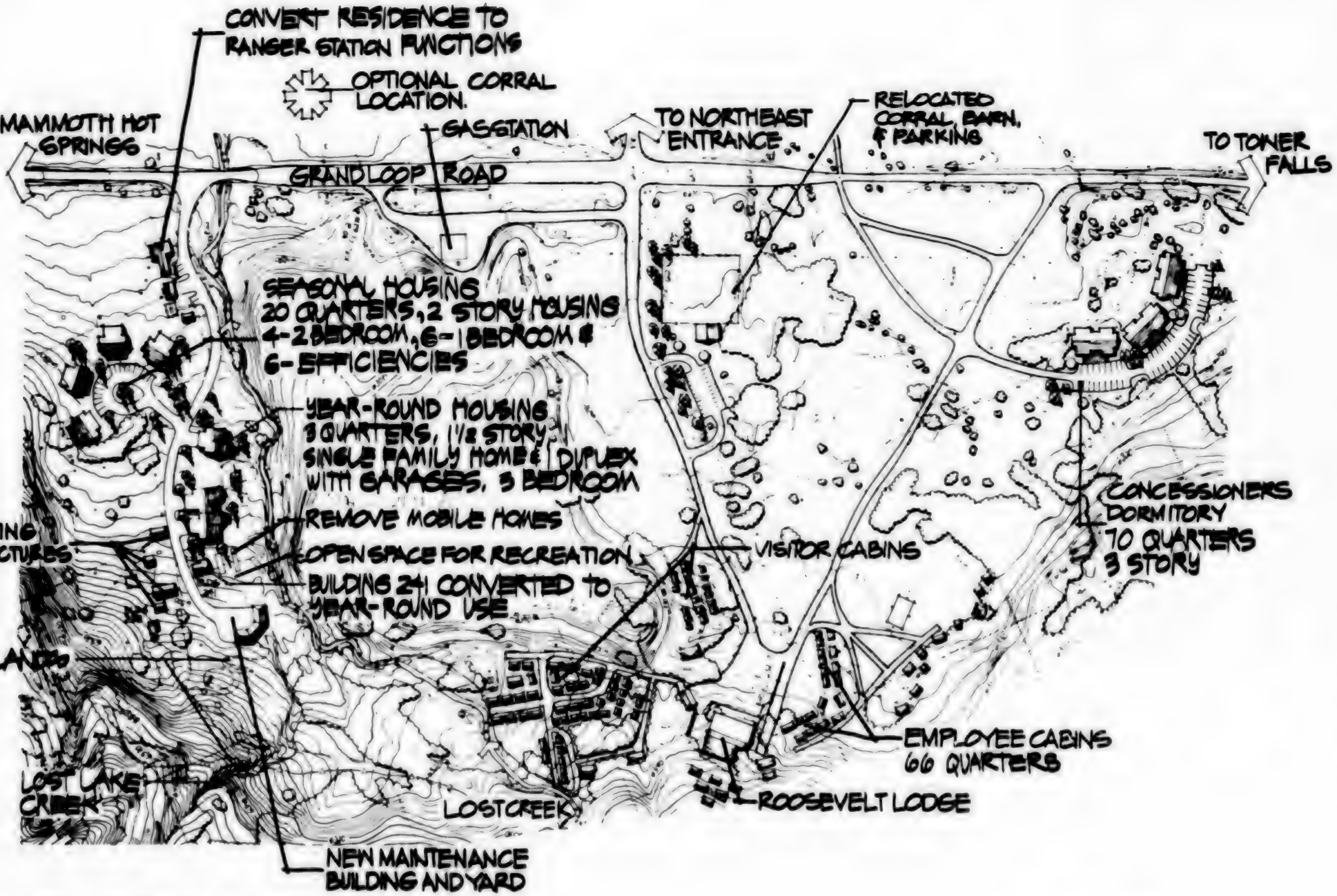
THE PROPOSAL

YELLOWSTONE NATIONAL PARK

Tower Junction (Tower Government Area and Roosevelt Lodge)

101 / 40308 / May 92

NORTH

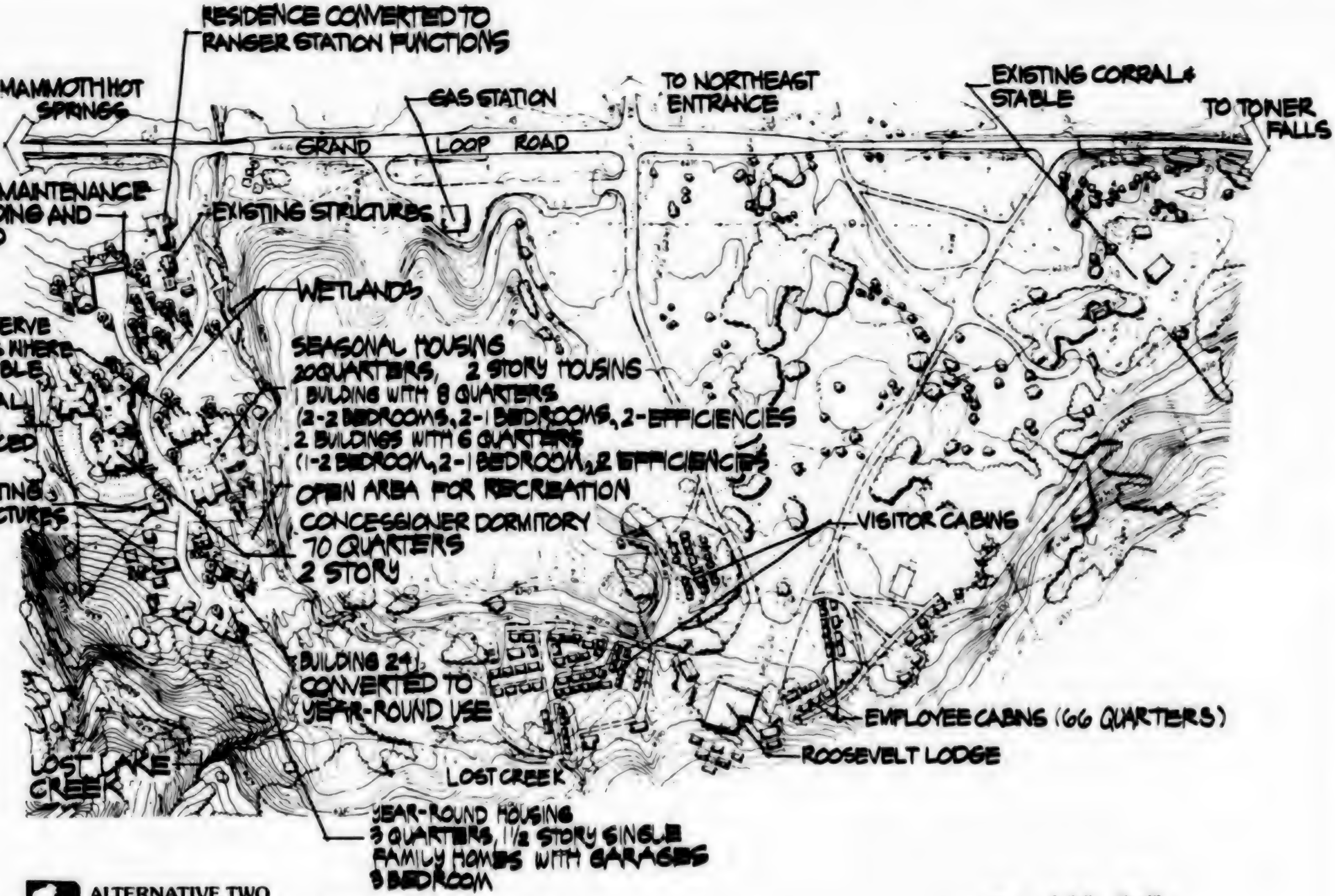

CONVERT RESIDENCE TO RANGER STATION FUNCTIONS
OPTIONAL CORRAL LOCATION.
TO MAMMOTH HOT SPRINGS
GAS STATION
TO NORTHEAST ENTRANCE
RELOCATED CORRAL, BARN, & PARKING
TO TOWER FALLS
GRAND LOOP ROAD
SEASONAL HOUSING 20 QUARTERS, 2 STORY HOUSING 4-2 BEDROOM, 6-1 BEDROOM & 6-EFFICIENCIES
YEAR-ROUND HOUSING 3 QUARTERS, 1 1/2 STORY SINGLE FAMILY HOME & DUPLEX WITH GARAGES, 3 BEDROOM
REMOVE MOBILE HOMES
OPEN SPACE FOR RECREATION
BUILDING 241 CONVERTED TO YEAR-ROUND USE
EXISTING STRUCTURES
WETLANDS
VISITOR CABINS
CONCESSIONERS DORMITORY 70 QUARTERS 3 STORY
EMPLOYEE CABINS 66 QUARTERS
ROOSEVELT LODGE
LOST LAKE CREEK
LOST CREEK
NEW MAINTENANCE BUILDING AND YARD
NORTH
0 40 80 160 240

ALTERNATIVE ONE

YELLOWSTONE NATIONAL PARK

Tower Junction (Tower Government Area and Roosevelt Lodge)

101 / 40309 / May 92


RESIDENCE CONVERTED TO RANGER STATION FUNCTIONS
TO MAMMOTH HOT SPRINGS
GAS STATION
TO NORTHEAST ENTRANCE
EXISTING CORRAL & STABLE
TO TOWER FALLS
GRAND LOOP ROAD
NEW MAINTENANCE BUILDING AND YARD
EXISTING STRUCTURES
WETLANDS
PRESERVE TREES WHERE POSSIBLE
CORRAL AREA REDUCED
SEASONAL HOUSING 20 QUARTERS, 2 STORY HOUSING
1 BUILDING WITH 8 QUARTERS
(2-2 BEDROOMS, 2-1 BEDROOMS, 2-EFFICIENCIES
2 BUILDINGS WITH 6 QUARTERS
(1-2 BEDROOM, 2-1 BEDROOM, 2 EFFICIENCIES
OPEN AREA FOR RECREATION
CONCESSIONER DORMITORY 70 QUARTERS 2 STORY
EXISTING STRUCTURES
VISITOR CABINS
BUILDING 24 CONVERTED TO YEAR-ROUND USE
EMPLOYEE CABINS (66 QUARTERS)
ROOSEVELT LODGE
LOST LAKE CREEK
LOST CREEK
YEAR-ROUND HOUSING
3 QUARTERS, 1 1/2 STORY SINGLE FAMILY HOMES WITH GARAGES
3 BEDROOM

ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

Tower Junction (Tower Government Area and Roosevelt Lodge)

101 / 40310 / May 92

WEST ENTRANCE

PURPOSE AND NEED

Early entrances to Yellowstone were situated along the easier routes following river drainages. A traditional route into Yellowstone from the west was the route used in 1877 by the Nez Perce Indians. This route followed the Madison River to its headwaters at the confluence of the Gibbon and Firehole rivers and then south to the geyser basins. In 1878, Superintendent Norris constructed a road along this route. In order to monitor travel and protect the park from poachers, who had been historically active along the west boundary, the Riverside Soldier Station was constructed on the Madison River four miles inside the park boundary in 1886.

The Yellowstone-Western Stage Company provided transportation and camping services for people entering the park from the West Entrance. Between 1898 and 1907, permits were issued for the construction of facilities within the park at the west boundary to accommodate this service. This resulted in the construction of offices, lodging facilities, storehouses, and a blacksmith shop. Development was also taking place outside the park boundary; the town of West Yellowstone, Montana, was incorporated in 1908. With the introduction of the automobile in 1915, a checking station was constructed along the park boundary at West Yellowstone. By 1917, the old stage transportation system was converted to automobile traffic and some of the facilities at the West Entrance were either torn down or adapted to serve the growing need for the new ranger staff assigned to this area.

Today, the West Entrance area is the National Park Service staging area for maintenance functions, entrance gate, and resource and visitor protection and emergency services for the West Subdistrict. Housing for NPS employees associated with area operations is also provided here.

Employees who live within the West Entrance area are affiliated with the NPS ranger, interpretive, and maintenance divisions. The total number of employees working in this area averages 15, with approximately 7 being year-round and 8 being seasonal. While existing housing will accommodate all current year-round employees, only 6 of the seasonal employees can be accommodated. The remaining employees must commute to West Entrance from West Yellowstone.

Staffing projections indicate that a total of 26 NPS employees would eventually be duty-stationed at the West Entrance. Housing would be provided for all employees in this area, with 17 housed year-round and 9 housed seasonally. In accordance with park policy, the existing 7 mobile homes would be removed and replaced with permanent structures. Other residential structures in West Entrance are in acceptable condition and can be used in the future, given modest renovation and maintenance. No existing residences meet handicapped accessibility standards.

The concessioner, Hamilton Stores, Inc. (HSI), operates a main staging facility in the West Entrance area, east of the government housing. Twenty-six employees are currently housed within the HSI complex, and the need for 80 additional employees has been projected. The needs for concessioner housing could be addressed by the concessioner outside of the park boundaries, due to the proximity of alternative, privately-held sites in this area that could be developed.

The community plan in this area would include a community center and recreation facilities.

Many of the park personnel who work in the West Subdistrict during the winter occupy posts in the interior of the park (including Madison Junction and Old Faithful). They must leave their vehicles at the West Entrance area, often for extended periods of time in harsh weather, while they are at their interior posts. In order to address this situation, two protected garages have recently been constructed at West Entrance. This has been effective; the program could be expanded to serve the remaining personnel who are projected to be in this situation.

Plans are currently being prepared for development of private land outside the park boundaries and adjacent to the West Entrance area. This raises two points of concern. First, such development may be extensive if approved as currently planned. It would be beneficial for employees housed at the West Entrance to have some visual screening from this development. Secondly, the current winter access to the West Entrance area is from a city road and then a private road just outside of the park. This arrangement may not be feasible with the new private development proposal. In addition, all winter vehicular traffic is directed through the maintenance area, which is unsafe.

Visibility of the West Entrance area is also a concern. As visitors approach the West Entrance gate along the main road, an existing duplex to the south of the road is clearly visible. Efforts should be made to minimize the visual impacts of this duplex.

Since a number of winter activities are staged out of West Yellowstone, the West Entrance area remains operational throughout the winter months. In order to serve the needs of visitors and protect the resources of the park at this time of the year, ranger and maintenance services will need to be provided from winterized facilities at West Entrance.

ALTERNATIVES

In the development of the community planning proposal for the West Entrance area, a number of alternatives were considered. These included a No-Action Alternative, the Proposal, and Alternatives One and Two, all described in this text. In addition, several other options were considered but determined to be inappropriate, and therefore not evaluated in a detailed manner.

The primary components of each plan are described below. Please refer to the related drawings for additional information.

Alternatives Considered but Rejected

As shown on the accompanying "Areas Considered for Development" Plan, a number of locations in the West Entrance area were evaluated for their suitability to support employee housing and visitor support facilities. Of these areas, Areas "C" and "D" were considered unsuitable for new development, due to the disturbance which would occur on these previously undisturbed areas. Area "A" was considered suitable for development provided that the historic structures in this area were retained. Area "B" was considered the most suitable for development. In addition to these general parameters, other site-specific concerns were considered in developing the range of acceptable alternatives. Alternatives were not pursued if they required extensive new disturbance of ground, required construction in utility areas, would not have retained selected historic structures, would have been visible from public roadways, or would have poorly integrated uses in the area.

No-Action Alternative

The No-Action Alternative would perpetuate existing conditions in the West Entrance area. Not all NPS employees would be provided with housing in the area, and some would continue to commute to work on a daily basis. Many employees who were housed in the area would continue to live in substandard mobile homes. Handicapped accessible housing would not be available. No community recreation facilities or common gathering areas would exist. Protected vehicle parking for interior duty-stationed rangers would continue to be inadequate. The current winter access to the West Entrance would remain uncertain, due to potential changes on adjacent private land. Traffic conflicts in the maintenance area would continue throughout the winter. The West Entrance development would continue to be visible to visitors, and potentially there would be visual impacts to employees from the new development on adjacent private land. Employee housing would not be properly winterized.

The Proposal

This plan addresses the community needs identified for the West Entrance area through redevelopment of several areas for employee housing and employee recreation areas. Existing historic buildings would be retained. Additional housing for NPS employees would be added, maintenance and operational concerns would be addressed, and the visitor experience would be improved. Some of the new construction would occur in previously disturbed areas. However, some areas of new disturbance would be required.

Housing

The projected needs for park employee housing would be met with this plan. Twelve new two-story, year-round quarters would be located in a cluster where the mobile homes are currently sited and north of the present corral. In addition, 3 existing year-round quarters would be rehabilitated and retained (one year-round house would be converted to a community center). Finally, 4 existing log homes on BLM land are currently used for year-round housing in West Yellowstone. If necessary, these structures could be brought into the West Entrance area and sited north of the present corral. Two of these buildings would be used for garages and 2 would be used for year-round quarters. A total of 17 year-round quarters would be provided through this combination of new and rehabilitated units. New construction could be phased through use of existing mobile homes while new units are constructed and through deferral of new hiring until units are constructed.

Nine seasonal quarters would be provided in new buildings clustered on the inside of the road loop serving the new year-round units. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. All newly constructed units would meet NPS housing design standards.

Building 441 would be renovated and retained for short-term use by NPS employees, including fire fighters, researchers, and trail crews.

Concessioner dormitory requirements would be met outside the park.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance The existing building and staging areas are suitable for current and future use, except for inadequate storage space. However, a short loop would be added to the road system to improve access.

Recreational Facilities A small community center with associated outdoor recreation facilities would be provided. An existing year-round residence west of the maintenance facility would be converted into the center, and outdoor facilities would be developed around this building.

Ranger Facilities Two more protected garage structures would be provided for use by interior duty-stationed employees. These would be located along the road opposite the similar existing garage on the eastern portion of the loop.

Circulation Winter access for vehicles serving the West Entrance and Hamilton Stores facilities would be rerouted. The existing route which loops from the park entrance around to the south and east to the existing maintenance area would be abandoned, and portions would be revegetated. The main park entrance road would be utilized as the new route, and a third lane for oversnow vehicles would be constructed parallel to the main road.

The road to the Hamilton Stores warehouse would be widened to better accommodate truck traffic.

Visual Impacts Native vegetation would be added to screen the duplex which is currently visible from the main road. In addition, native vegetation would be added along the western park boundary to screen potential private sector development.

Alternative One

This plan partially addresses the community needs identified for the West Entrance area through redevelopment of several areas for employee housing and employee recreation areas. Existing historic buildings would be retained. Additional housing for NPS employees would be added, maintenance and operational concerns would be addressed, and the visitor experience would be improved. Some of the new construction would occur in previously disturbed areas. However, substantial areas of new disturbance would be required.

Housing The projected needs for park employee housing would be met with this plan. Eleven new two-story, year-round quarters would be located in a cluster where the mobile homes are currently sited. In addition, 4 existing year-round quarters would be rehabilitated and retained. Finally, 4 existing log homes on BLM land are currently used for year- round housing in West Yellowstone. If necessary, these structures could be brought into the West Entrance area and sited near other new year-round houses. Two of these buildings would be used for garages and 2 would be used for year-round quarters. A total of 17 year-round quarters would be provided through this combination of new and rehabilitated units. New construction could be phased through use of existing mobile homes while new units are constructed and through deferral of new hiring until units are constructed.

Eight seasonal quarters would be provided in new one-story buildings clustered east of the maintenance facility. This location would be near both the maintenance facility and the parking garages, resulting in added noise impacts to the residences. In addition, one seasonal quarters would be sited east of the new year-round units. This unit would be separate from other seasonal residences. The new construction would require careful phasing in conjunction with the removal of existing mobile homes. All newly constructed units would meet NPS housing design standards.

In addition to this park employee housing, forty dormitory quarters for concessioner employees would be added east of the park employee housing, requiring some new disturbance of land.

Building 441 would be renovated and retained for short-term use by NPS employees, including fire fighters, researchers, and trail crews.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

The existing building and staging areas are suitable for current and future use. The circulation system would remain intact.

Recreational Facilities

A small community center, with associated outdoor recreation facilities, would be provided in the middle of the new year-round unit cluster.

Ranger Facilities

One more protected garage structure would be provided for use by interior duty-stationed rangers. This would be located on the existing concrete pad already in place for this structure. This location would increase noise impacts in the residential areas. The addition of just one garage would be insufficient to accommodate all rangers who need this facility.

Circulation

Winter access for vehicles serving the West Entrance and Hamilton Stores facilities would be rerouted. The existing route which loops from the park entrance around to the south and east to the existing maintenance area would be abandoned, and portions would be revegetated. The main park entrance road would be utilized as the new route, and a third lane for oversnow vehicles would be constructed parallel to the main road.

The road to the Hamilton Stores warehouse would be widened to better accommodate truck traffic.

Visual Impacts

Native vegetation would be added to screen the duplex which is currently visible from the main road. In addition, native vegetation would be added along the western park boundary to screen potential private sector development.

Alternative Two

This plan partially addresses the community needs identified for the West Entrance area through redevelopment of several areas for employee housing and employee recreation areas. Existing historic buildings would be retained. Additional housing for NPS employees would be added, maintenance and operational concerns would be addressed, and the visitor experience would be improved. Some of the new construction would occur in previously disturbed areas. However, substantial areas of new disturbance would be required.

Housing

The projected needs for park employee housing would be met with this plan. Eleven new two-story, year-round quarters would be located in a cluster where the mobile homes are currently sited; however, new disturbance of ground would occur. In addition, 4 existing year-round quarters would be rehabilitated and retained. Finally, 4 existing log homes on BLM land are currently used for year-round housing in West Yellowstone. If necessary, these structures could be brought into the West Entrance area and sited near the new community center, which would require new ground disturbance. Two of these buildings would be used for garages and two would be used for year-round quarters. A total of 17 year-round quarters would be provided through this combination of new and rehabilitated units. New construction could be phased through the use of existing mobile homes while new units are constructed and through deferral of new hiring until units are constructed.

Eight seasonal quarters would be provided in new one-story buildings clustered south of the maintenance facility. This location would be near both the maintenance facility and the parking garages, resulting in added noise impacts to the residents. In addition, one seasonal quarters would be sited south of the new year-round units. The new construction would require careful phasing in the removal of existing mobile homes. All newly constructed units would meet NPS housing design standards.

Concessioner dormitory requirements would be met outside the park.

Building 441 would be renovated and retained for short-term use by NPS employees, including fire fighters, researchers, and trail crews.

With the completion of the new construction, at least 5 percent of the total employee quarters would be handicapped accessible.

Maintenance

The existing building and staging areas are suitable for current and future use. The circulation system would remain intact.

Recreational Facilities

A small community center with associated outdoor recreation facilities would be provided north of the new year-round unit cluster.

Ranger Facilities

One more protected garage structure would be provided for use by interior duty-stationed rangers. This would be located on the existing concrete pad already in place for this structure. This location would increase noise impacts in the residential areas. The addition of just one garage would be insufficient to accommodate all rangers who need this facility.

Circulation

Winter access for vehicles serving the West Entrance and Hamilton Stores facilities would be rerouted. The existing route which loops from the park entrance around to the south and east to the existing maintenance area would be abandoned, and portions would be revegetated. The main park entrance road would be utilized as the new route, and a third lane for oversnow vehicles would be constructed parallel to the main road.

The road to the Hamilton Stores Warehouse would be widened to better accommodate truck traffic.

Visual Impact Native vegetation would be added to screen the duplex which is currently visible from the main road. In addition, native vegetation would be added along the western park boundary to screen potential private sector development.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

SOILS AND GEOLOGY

Affected Environment

The West Entrance lies on the broad, flat Madison Plateau. Soils are predominantly very well-drained obsidian sand with a thin layer of topsoil. Soils in the area are developed in glacial outwash with a thin veneer of loess in the surface layer. These soils are moderately coarse to coarse in texture and found as deep strata with many gravel sized rock fragments. They are low in nutrients and extremely porous. The soils have few boulders and no bedrock is present. The soils, however, are very poorly suited for reclamation. The surface layer is easily disturbed, and material below is sandy and infertile. Slopes are gentle to flat.

Seismic activity in this area has been monitored. Area soils are comprised of thick sand valley fill, and are highly unstable. The 100-year earthquake occurrence is estimated to be a magnitude of 7.0 on the Richter scale.

Radon readings taken during 1989-1990 in surrounding residences ranged from 2.3 to 3.4 picocuries/liter. This suggests that the radon contamination potential in the area is low to moderate.

Environmental Consequences

No-Action Alternative

Under this alternative, soils would continue to be compacted, resulting in reduced water infiltration in the developed area. Continued use of existing roads would not result in any new disturbance to soils.

Total impacts under the No-Action Alterative would be minor in the short term but would in time result in accelerated deterioration of soils, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils on 3.4 acres. Construction activities would cause both temporary and permanent soil compaction, which could result in increased runoff and some minor soil erosion.

Permanent covering of soils with new road segments, parking areas, and facilities would result in the loss of water infiltration to the underlying soil areas. Runoff would be diverted to the surrounding areas and adjacent ground cover could increase, thereby reducing erosion potential.

Removing existing road segments, mobile homes, and scattered buildings and using native plant materials to return sites to more natural conditions would restore 1.3 acres of soil and vegetation.

Overall, impacts to soils would be minor in the short-term, but soils would gradually deteriorate over time as a result of compaction, resulting in some degradation of existing soil.

Special measures would be taken to preserve topsoil during construction activities. The long-term effects to soils would be insignificant after completion of the mitigating measures.

Proper design of earthquake-resistant structures would be necessary.

A site-specific radon measurement would be taken prior to any building construction, in order to determine whether mitigation measures are necessary.

Alternative One

Under Alternative One, construction would disturb 4.6 acres. Approximately 1.3 acres of disturbed sites would be restored. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative One.

Alternative Two

Under Alternative Two, construction would disturb 4.7 acres. Approximately 1.1 acres of disturbed sites would be restored. The types of impacts would be similar to those described for the proposed action.

Requirements for design of earthquake-resistant structures and site-specific radon measurements prior to construction would be necessary under Alternative Two.

VEGETATION

Affected Environment

The area considered for development is a PICO/CARO habitat type with an LP2 cover type. It is a dry forested site dominated by lodgepole pine in the overstory, with lodgepole pine and whitebark pine seedlings in the understory. The herbaceous layer is dominated by Ross's sedge, Wheeler's bluegrass, sulphur buckwheat, pale agoseris, rosy pussytoes, silvery lupine, fireweed, yarrow, bottlebrush squirrel-tail, and kinnikinnick. No vegetative, soil, or hydrological indicators of wetlands are present.

No sensitive, threatened, or endangered plant species were found.

Environmental Consequences

No-Action Alternative

Under this alternative, vegetation trampling and tree root damage would continue in the developed area. Continued use of existing roads would not result in any new disturbance to vegetation.

Total impacts under the No-Action Alterative would be minor in the short term but would in time result in continued deterioration of vegetation, primarily in the developed area.

The Proposal

The emphasis of the proposed action would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some new construction for access and parking, along with new facility construction, including utilities. Construction activities would cause both temporary and permanent disturbance, displacement, and removal of vegetation on 3.4 acres. Some lodgepole pines, including potential hazard trees, would be disturbed or permanently removed during construction. The removal of any trees may break the existing forest canopy and increase the potential for windfall and associated damage. Grasses and other vegetation would also be disturbed or removed.

Removing existing road segments, mobile homes, and scattered buildings, and using native plant materials to return sites to more natural conditions would restore 1.3 acres of soil and vegetation.

Overall, impacts to vegetation would be minor in the short- term, but some deterioration of vegetation would occur over time in developed areas.

There are portions of the proposed development where dense tree understory exists along with heavy accumulations of downed fuels. Hazard fuels management (with the objective of reducing fuel accumulations and breaking up continuous fuels around developed areas) may be necessary to reduce the threat of unwanted fire.

The potential for proliferation of exotic plant species would be considered before undertaking any ground disturbance.

Following construction, revegetation with native plant materials would return disturbed areas to a more natural condition. Seeds and transplants, collected from construction areas prior to development, would be used for revegetation. The long-term effects to vegetation would be insignificant after completion of the revegetation efforts.

Alternative One

Under Alternative One, construction would disturb 4.6 acres. Approximately 1.3 acres of disturbed sites would be restored. The types of impacts would be similar to those described for the proposed action.

Alternative Two

Under Alternative Two, construction would disturb 4.7 acres. Approximately 1.1 acres of disturbed sites would be restored. The types of impacts would be similar to those described for the proposed action.

WILDLIFE

Affected Environment

The West Entrance housing area is immediately adjacent to the town of West Yellowstone, Montana. Wildlife species living in the area include deer, elk, moose, grizzly and black bears, and small mammals such as red squirrels and snowshoe hares. The area is part of the volcanic plateau left from Yellowstone's cataclysmic eruptions and subsequent lava flows. The resultant soil and forest type is a lodgepole-dominated cover with sparse understory that provides relatively poor wildlife cover and habitat diversity.

Birds using this general area of the park are typical forest dwellers such as ruby-crowned kinglet, yellow rumped warbler, Clark's nutcracker, hairy woodpecker, raven, mountain bluebird, American robin, and dark-eyed junco. There is the possibility that the great gray owl inhabits this area.

Little information is available on the distribution and abundance of amphibian and reptile species within Yellowstone. Most of the species occurring in the park are thought to be widely distributed. Reptile species include wandering garter snake, rubber boa, and short horned lizard. No amphibian species are known to exist in the vicinity of the project area.

Environmental Consequences

No-Action Alternative

Under the No-Action Alternative, there would be no increased impacts to wildlife. Continued human presence would continue to displace resident birds and animals.

The Proposal

The proposed action would disturb approximately 3.4 acres of wildlife habitat, including some areas which are currently within the development boundaries. Construction and restoration activities would temporarily displace various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Impacts to amphibians and aquatic invertebrates from potential runoff of petroleum and chemical products from roads and parking areas are unknown. However, overall impacts to wildlife would be minor, and there would be no significant short- or long-term effects upon wildlife populations.

Alternative One

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative One would disturb approximately 4.6 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative One, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

Alternative Two

Impacts to wildlife populations would be similar to those described for the proposed action, with temporary disturbance of various resident birds, small mammals, amphibians, black bear, elk, deer, and moose. Alternative Two would disturb approximately 4.7 acres of wildlife habitat, some of which is currently within the development boundaries. Under Alternative Two, overall impacts to wildlife populations would be minor, and there would be no significant short- or long-term effects.

THREATENED AND ENDANGERED SPECIES

The discussion of the effects this project would have on threatened and endangered species is found in the chapter titled "Threatened and Endangered Species."

FLOODPLAINS AND WETLANDS

Affected Environment

The West Entrance area is not in any 100- or 500-year floodplains or flash-flood hazard areas.

A wetlands inventory of this area has been completed. No vegetative, soil, or hydrological indicators of wetlands are present.

Environmental Consequences

No-Action Alternative

There would be no wetlands impacted by this alternative.

The Proposal

There would be no wetlands impacted by this alternative.

Alternative One

There would be no wetlands impacted by this alternative.

Alternative Two

There would be no wetlands impacted by this alternative.

WATER QUALITY

Affected Environment

There are no surface water resources in the West Entrance housing area. Local domestic water supply for the West Entrance housing area is obtained from the town of West Yellowstone. The National Park Service does not own water rights to this source. Water quality is excellent and there is an adequate supply for all existing and proposed development. Wastewater is piped to West Yellowstone for treatment. A backup septic system for sewage storage, located within the West Entrance area, is available for use during power failures.

The present developed area is over one mile from any perennial streams. The underlying materials are unconsolidated fluvial deposits and therefore quite permeable.

Environmental Consequences

No-Action Alternative

Continued operations at West Entrance could result in potential sources of surface and groundwater pollution in this area from road maintenance activities; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum and chemical products; and runoff of petroleum products from roads and parking areas.

The park has an established program to replace leaking underground tanks. New tanks are designed and constructed to control leaks, spills, and contamination. Any leaking tanks will be replaced within the parameters of this program.

The Proposal

Construction activities would cause minor impacts to surface and groundwater sources. No construction would occur over the existing septic system. Sources of impacts potentially include increased stream sedimentation from road maintenance or the construction of roads and buildings; sewer line leaks and wastewater overflow; leaking underground and above ground storage tanks, particularly involving petroleum products; and runoff of petroleum and chemical products from roads and parking areas. Given proper attention to construction techniques, no significant impact to the water quality of the area would occur. Overall impacts would be minor and would not result in any long-term effects to the area's water resources.

Alternative One

Development activities would be similar to those described for the proposed action, except that development would render the backup septic leach field unusable. Overall impacts would be minor and would not result in any effects to the area's water resources.

Alternative Two

Development activities would be similar to those described for the proposed action, except that development would render the backup septic leach field unusable. Overall impacts would be minor and would not result in any effects to the area's water resources.

FISHERIES

Affected Environment

There are no surface water resources in the West Entrance housing area and thus no fisheries resources.

Environmental Consequences

No-Action Alternative

There would be no impacts on the fisheries.

The Proposal

There would be no impacts on the fisheries.

Alternative One

There would be no impacts on the fisheries.

Alternative Two

There would be no impacts on the fisheries.

AIR QUALITY

Affected Environment

Air quality within the West Entrance area is generally good, with occasional periods of degradation caused by regional haze or forest fire smoke. Temperature inversions, particularly in winter, often trap ground fog, motor vehicle emissions, and smoke and haze from wood-burning stoves near the ground.

There is no air quality monitoring equipment in the West Entrance area and baseline data specific to this area is not available. The closest air quality monitoring station is to the southeast at the Lake Ranger Station where criteria pollutants are monitored against national ambient air quality standards. Another air quality monitoring station is located to the northeast at the Tower Ranger Station where acid precipitation is monitored.

Environmental Consequences

No-Action Alternative

There would be no increased effects on air quality.

The Proposal

It is expected that there would be localized increases in vehicular emissions, dust, and fumes from construction activities. Use of propane and oil heaters would increase the amount of particulates in the air. These particulates would have a minimal and temporary impact. Wood stove emissions could be mitigated by retro-fitting existing wood burning units with catalytic converters. Short- and long-term effects are not expected to occur in measurable quantities.

Alternative One

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative One are not expected to occur in measurable quantities.

Alternative Two

Impacts to air quality would be similar to the proposed action. Short- and long-term effects under Alternative Two are not expected to occur in measurable quantities.

VISUAL QUALITY

Affected Environment

The West Entrance developed area lies in the broad, flat Madison Valley. The developed area is somewhat visible from the West Entrance Road and from adjoining land outside the park. The area contains one historic structure, numerous non-historic residences and trailers, and several maintenance buildings. Although much of the terrain has already been disturbed, the undisturbed area consists of medium-density lodgepole pine, grasses, and forbs.

Environmental Consequences

No-Action Alternative

There would be no increased impacts to visual quality.

The Proposal

Native trees would be planted along the West Entrance Road to aid in screening the developed area from visitors. The existing winter access road from West Yellowstone to the housing area would be reclaimed and revegetated, increasing the visual buffer between the employee housing area and the town of West Yellowstone. However, proposed development outside the park would increase visual impacts to park residents. Removal of the existing mobile homes would improve the aesthetic appearance of the area. Nighttime light pollution from the area would increase.

Alternative One
Impacts to the visual quality would be similar to the proposed action.

Alternative Two
Impacts to the visual quality would be similar to the proposed action.

CULTURAL RESOURCES

Affected Environment

The proposed development would be located in and adjacent to the West Entrance government housing area. The area proposed for development has been intensively surveyed, in accordance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation, and no archeological sites were documented (Capek 1987, Cannon and Phillips 1991).

There are three historic structures in the government housing area. They are the ranger station (# 133, now a residence/office, eligibility to the National Register undetermined), a cabin/storage building (# 69, eligibility to the National Register undetermined), and the West Entrance dormitory (# 441, former Bacon Rind Road Camp bunkhouse, determined ineligible for the National Register). According to the List of Classified Structures (LCS), the ranger station is architecturally significant and probably eligible for the National Register. Because the eligibility of the other two structures has not been officially determined, the structures must be treated as if they are eligible for the National Register.

A fourth building, the West Entrance dormitory, has been determined ineligible for the National Register. The effect of the project upon this structure does not need to be considered.

Four existing log buildings may be relocated to the West Entrance area. The National Register status of these buildings is unknown.

Environmental Consequences

For all alternatives, no known archeological resources would be affected by the proposed project (Capek 1987, Cannon and Phillips 1991). If archeological resources were discovered during construction and could not be avoided, work would be stopped and consultation initiated with the NPS regional office and the Montana State Historic Preservation Office.

There are two historic structures in the West Entrance government housing area that could potentially be visually affected by the project. These structures are the ranger station and the cabin/storage building.

If any buildings are moved into the West Entrance area and would have an impact on properties eligible for or listed on the National Register of Historic Places, the Montana State Historic Preservation Office would be afforded an opportunity to comment on the proposed undertaking. If the Montana SHPO objected and the NPS was unable to resolve the objection, the NPS would initiate consultation with the Advisory Council on Historic Preservation.

The National Park Service would ensure that all work would be carried out in conformance with the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation and the Secretary of the Interior Standards for Rehabilitation.

SOCIAL AND ECONOMIC RESOURCES

VISITOR USE

Affected Environment

The hub of visitor use in this area is the entrance station. According to National Park Service records, during the period January 1 through December 31, 1990, the West Entrance was the entry point for 39 percent of Yellowstone visitors. Visitors occasionally stop to obtain backcountry permits at the ranger station or to use the telephone near the entrance gate. During the winter months, the road from the entrance station into the park is not plowed. The entrance station serves snow vehicles entering the park.

The physical condition of the housing area may affect visitor use by creating an adverse visual impact. This issue is addressed in the "Visual Quality" section for West Entrance.

Environmental Consequences

No-Action Alternative

Under this alternative, visitor services would be limited to those provided by the current number of NPS staff. Provision of visitor services during the winter would be very limited. Visitor services could be adversely affected, due to low NPS employee morale.

The Proposal
The project area is not in a visitor use area. However, during the construction phase, noise may be heard in visitor use areas and could have an adverse effect on visitors; this would be a short-term effect. More employees would be available to serve visitors, on a year-round basis. Visitor services could be improved, due to higher NPS employee morale.

Alternative One
The effects of Alternative One would be the same as those described under the Proposal.

Alternative Two
The effects of Alternative Two would be the same as those described under the Proposal.

NATIONAL PARK SERVICE AND CONCESSIONER OPERATIONS

Affected Environment

The National Park Service (NPS) administers their maintenance operations, visitor services, protection, and emergency services for the West Subdistrict from this area. The NPS operates an entrance station, ranger office, and government maintenance facilities at this site. National Park Service employee quarters consist of 4 single-family residences, 1 duplex, and 7 mobile homes. During peak season, the NPS employs an average of 15 employees at West Entrance.

The community of West Yellowstone, Montana, is located adjacent to the West Entrance. Since West Yellowstone is a resort town, private rental quarters are very expensive. Some advantages to the governments' retention of a housing area in the present location are the absence of cost for building sites and the fact that the infrastructure is already in place.

Hamilton Stores, Inc. (HSI), operates its administrative headquarters and warehouse facilities (operating year-round) in an area east of the government housing area. In peak season, HSI employs 50-75 persons at West Entrance. Employee housing consists of a dormitory adjacent to the warehouse. Hamilton Stores, Inc., is requesting the addition of 40 dormitory rooms in the West Entrance area in order to better meet the housing needs of their employees.

Environmental Consequences

No-Action Alternative

This alternative would have no immediate adverse impacts on the NPS administrative or concession operations in the West Entrance area. However, in the long term, if housing needs are not met, the result would be further overcrowding and employee dissatisfaction. This could create an adverse impact on the NPS and concessioner's hiring ability and, therefore, on their operations.

The Proposal

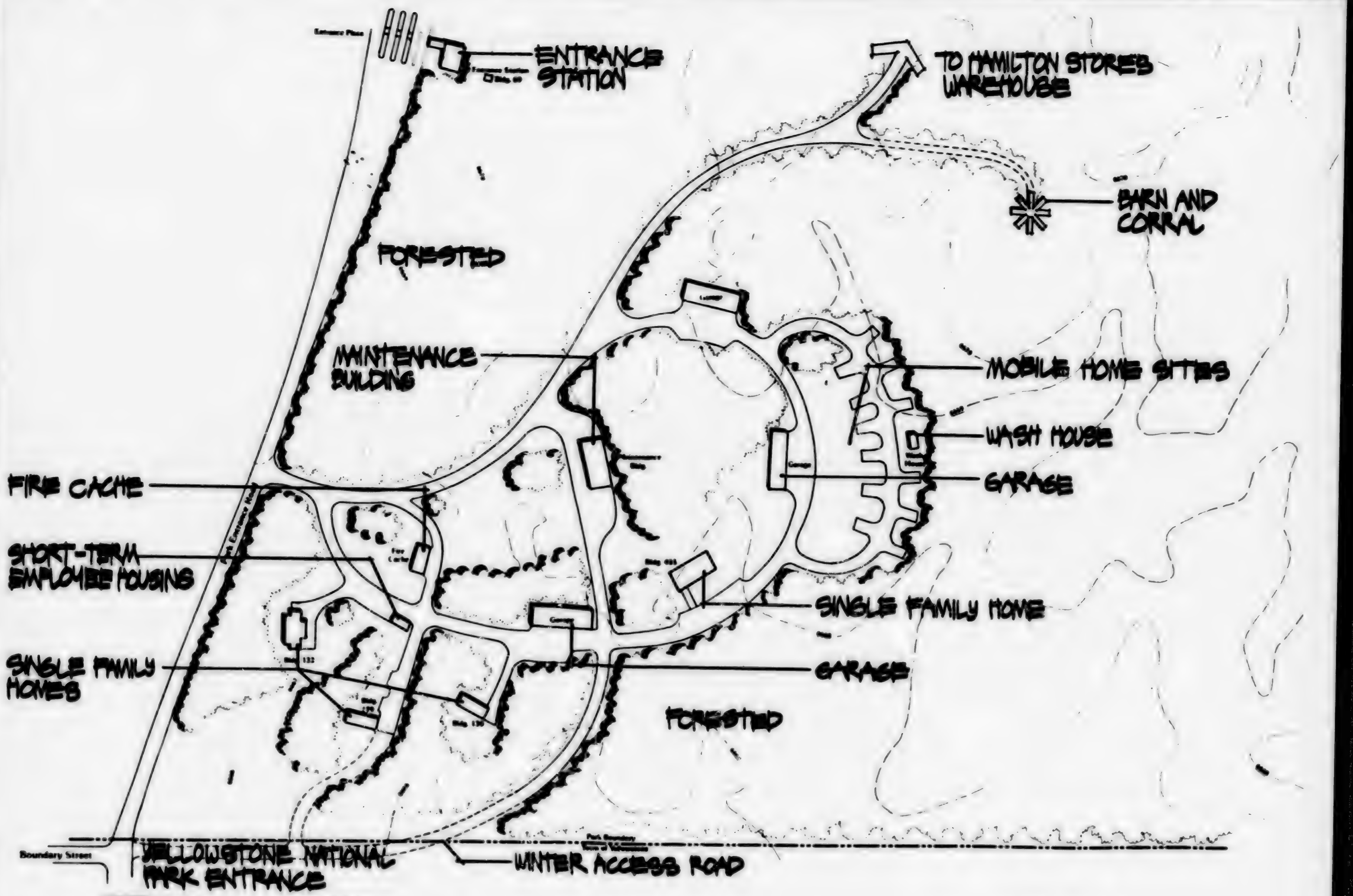
The proposal would meet the NPS program requirements for housing. Concessioner dormitory requirements would be met outside the park. Construction of new housing units would improve employee morale by providing better housing with increased privacy, additional living and storage space, and by alleviating overcrowding. Recreation and community facilities would be improved. The corral and barn would have to be relocated to an area downwind from the residential area. The construction projects resulting from the proposal would provide economic benefits to the regional contractors and suppliers of building materials. Construction activity, associated noise, and dust could have an adverse effect on residents near the area of construction. This would only be a short-term adverse effect. There would be no known long-term adverse effects.

Alternative One

A concessioner dormitory would be built east of the government housing area, increasing the amount of noise and dust during the construction period. Otherwise, the effects of Alternative One would be similar to those described under the Proposal.

Alternative Two

The effects of Alternative Two would be the same as those described under the Proposal.

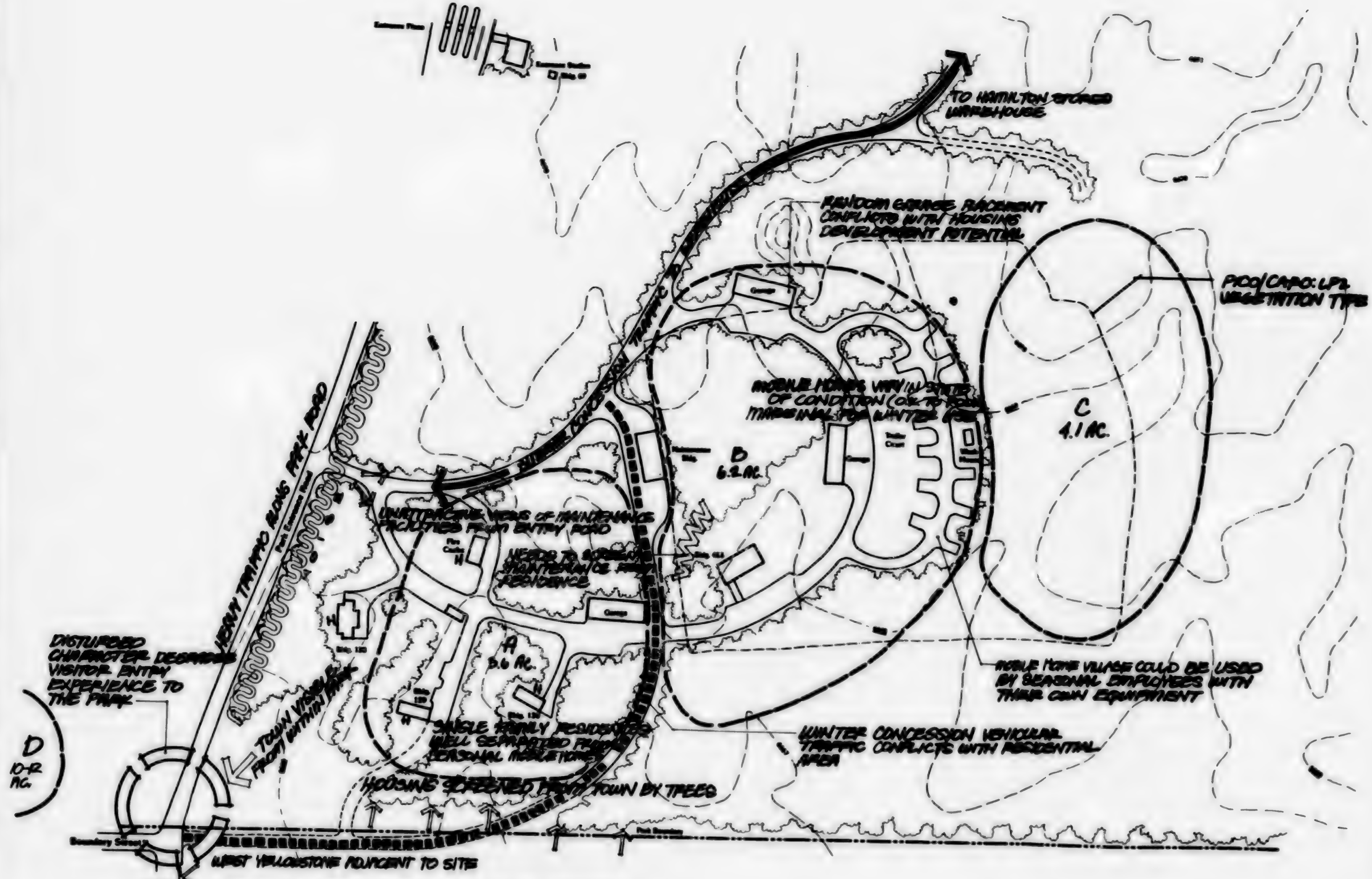


EXISTING CONDITIONS

YELLOWSTONE NATIONAL PARK

West Entrance Park Employee Housing

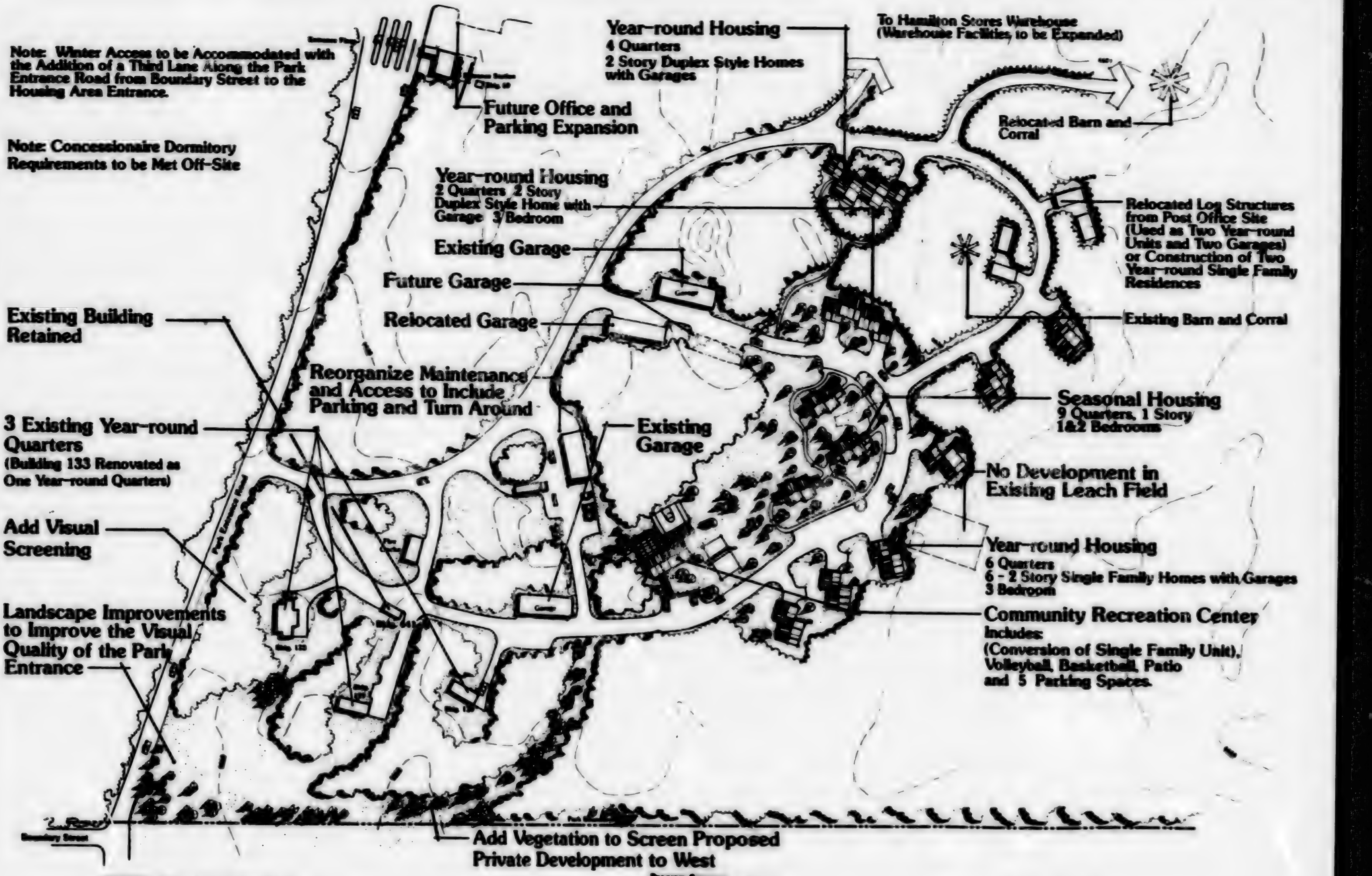
101 / 40311 / May 92


TO HAMILTON STORES WAREHOUSE
RANDOM GARAGE PLACEMENT CONFLICTS WITH HOUSING DEVELOPMENT POTENTIAL
PICO/CAPO: LP2 VEGETATION TYPE
MOBILE HOMES VARY IN STATE OF CONDITION (O.K. TO POOR) MARGINAL FOR WINTER USE
C
4.1 AC.
B
6.2 AC.
HEAVY TRAFFIC ALONG PARK ROAD
UNATTRACTIVE VIEWS OF MAINTENANCE FACILITIES FROM ENTRY ROAD
NEEDS TO SCREEN MAINTENANCE FROM RESIDENCE
A
3.6 AC.
DISTURBED CHARACTER DEGRADES VISITOR ENTRY EXPERIENCE TO THE PARK
TOWN VISIBLE FROM WITHIN PARK
D
10-12 AC.
SINGLE FAMILY RESIDENCES WELL SEPARATED FROM SEASONAL MOBILE HOMES
HOUSING SCREENED FROM TOWN BY TREES
MOBILE HOME VILLAGE COULD BE USED BY SEASONAL EMPLOYEES WITH THEIR OWN EQUIPMENT
WINTER CONCESSION VEHICULAR TRAFFIC CONFLICTS WITH RESIDENTIAL AREA
CONCESSION TRAFFIC
Garage
Boundary Street
Park Boundary
WEST YELLOWSTONE ADJACENT TO SITE

AREAS CONSIDERED FOR DEVELOPMENT
YELLOWSTONE NATIONAL PARK
West Entrance Park Employee Housing

101 / 40312 / May 92

NORTH


Note: Winter Access to be Accommodated with the Addition of a Third Lane Along the Park Entrance Road from Boundary Street to the Housing Area Entrance.
Note: Concessionaire Dormitory Requirements to be Met Off-Site
Future Office and Parking Expansion
Year-round Housing
4 Quarters
2 Story Duplex Style Homes with Garages
To Hamilton Stores Warehouse
(Warehouse Facilities to be Expanded)
Relocated Barn and Corral
Year-round Housing
2 Quarters 2 Story Duplex Style Home with Garage 3 Bedroom
Relocated Log Structures from Post Office Site (Used as Two Year-round Units and Two Garages) or Construction of Two Year-round Single Family Residences
Existing Garage
Future Garage
Relocated Garage
Existing Barn and Corral
Existing Building Retained
Reorganize Maintenance and Access to Include Parking and Turn Around
Seasonal Housing
9 Quarters, 1 Story
1&2 Bedrooms
3 Existing Year-round Quarters
(Building 133 Renovated as One Year-round Quarters)
Existing Garage
No Development in Existing Leach Field
Add Visual Screening
Year-round Housing
6 Quarters
6 - 2 Story Single Family Homes with Garages
3 Bedroom
Landscape Improvements to Improve the Visual Quality of the Park Entrance
Community Recreation Center
Includes:
(Conversion of Single Family Unit),
Volleyball, Basketball, Patio
and 5 Parking Spaces.
Park Entrance Road
Boundary Street
Add Vegetation to Screen Proposed Private Development to West
NORTH
SCALE 1"=60'-0"

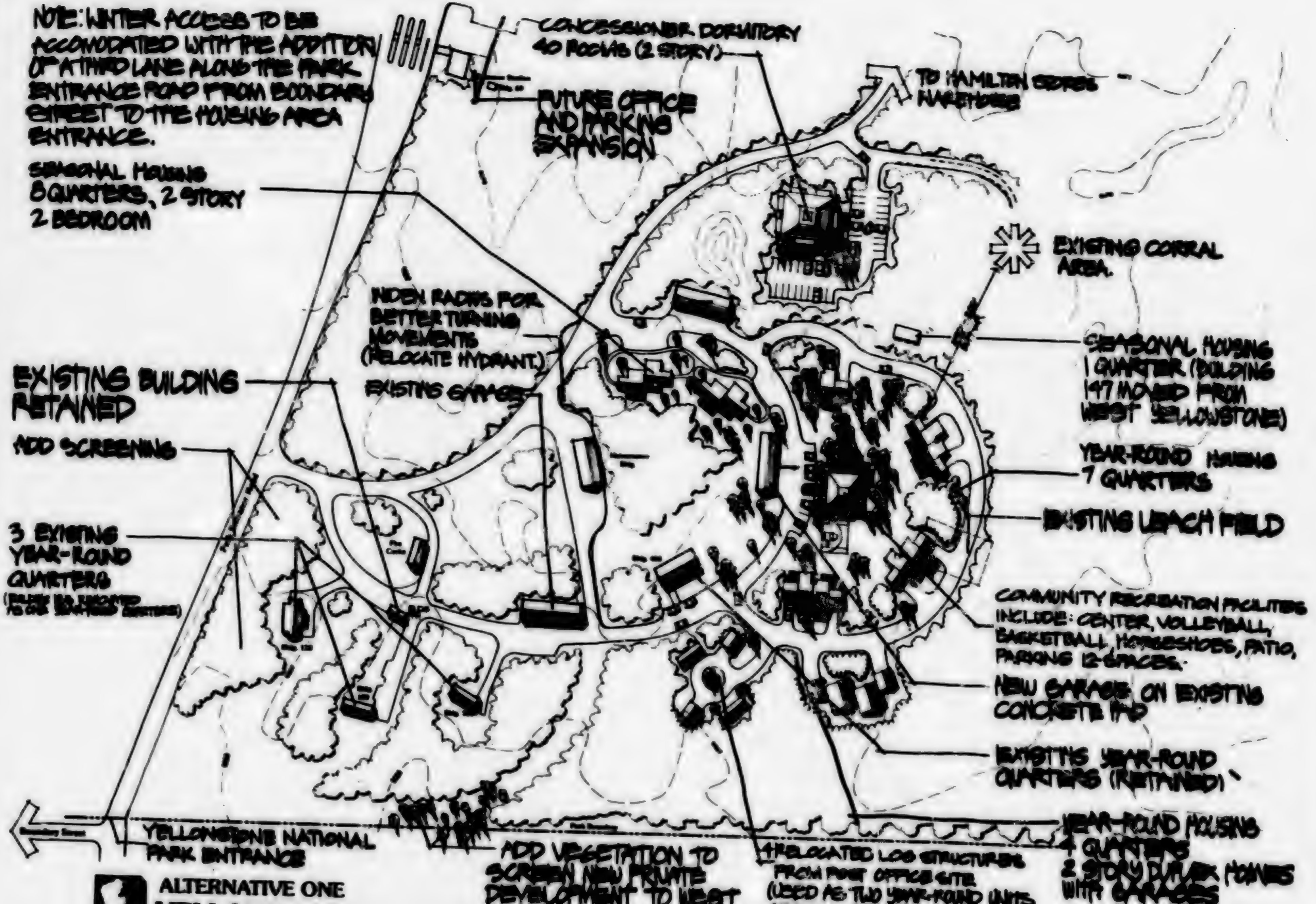
THE PROPOSAL

YELLOWSTONE NATIONAL PARK

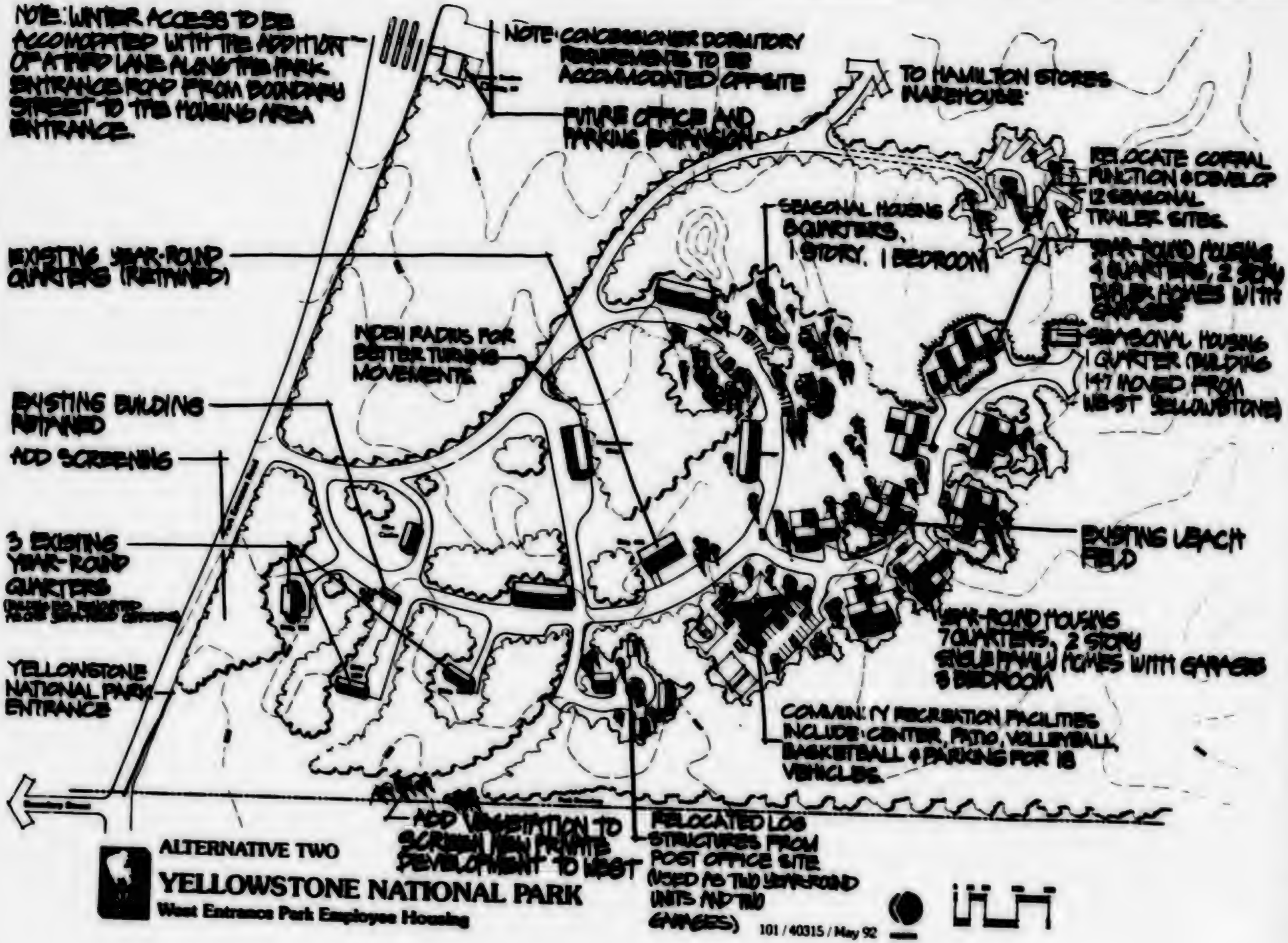
West Entrance Park Employee Housing

Program Summary
Retain 3 Year-round Quarters
Retain 0 Seasonal Quarters
Construct 14 Year-round Quarters
Construct 9 Seasonal Quarters

101 / 40313 / May 92


NOTE: WINTER ACCESS TO BE ACCOMODATED WITH THE ADDITION OF A THIRD LANE ALONG THE PARK ENTRANCE ROAD FROM BOUNDARY STREET TO THE HOUSING AREA ENTRANCE.
CONCESSIONER DORMITORY 40 ROOMS (2 STORY)
FUTURE OFFICE AND PARKING EXPANSION
TO HAMILTON STORES WAREHOUSE
SEASONAL HOUSING 8 QUARTERS, 2 STORY 2 BEDROOM
EXISTING CORRAL AREA.
WIDEN RADIUS FOR BETTER TURNING MOVEMENTS (RELOCATE HYDRANT.)
EXISTING GARAGE
EXISTING BUILDING RETAINED
SEASONAL HOUSING 1 QUARTER (BUILDING 147 MOVED FROM WEST YELLOWSTONE)
ADD SCREENING
YEAR-ROUND HOUSING 7 QUARTERS
EXISTING LEACH FIELD
3 EXISTING YEAR-ROUND QUARTERS
COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, VOLLEYBALL, BASKETBALL, HORSESHOES, PATIO, PARKING 12 SPACES.
NEW GARAGE ON EXISTING CONCRETE PAD
EXISTING YEAR-ROUND QUARTERS (RETAINED)
YELLOWSTONE NATIONAL PARK ENTRANCE
ADD VEGETATION TO SCREEN NEW PRIVATE DEVELOPMENT TO WEST
4 RELOCATED LOG STRUCTURES FROM POST OFFICE SITE (USED AS TWO YEAR-ROUND UNITS
YEAR-ROUND HOUSING 4 QUARTERS 2 STORY DUPLEX HOMES WITH GARAGES

ALTERNATIVE ONE


NOTE: WINTER ACCESS TO BE ACCOMODATED WITH THE ADDITION OF A THIRD LANE ALONG THE PARK ENTRANCE ROAD FROM BOUNDARY STREET TO THE HOUSING AREA ENTRANCE.
NOTE: CONCESSIONER DORMITORY REQUIREMENTS TO BE ACCOMMODATED OFFSITE
FUTURE OFFICE AND PARKING EXPANSION
TO HAMILTON STORES WAREHOUSE
RELOCATE CORRAL FUNCTION & DEVELOP 12 SEASONAL TRAILER SITES.
SEASONAL HOUSING 8 QUARTERS, 1 STORY, 1 BEDROOM
YEAR-ROUND HOUSING 4 QUARTERS, 2 STORY DUPLEX HOMES WITH GARAGES
SEASONAL HOUSING 1 QUARTER (BUILDING 147 MOVED FROM WEST YELLOWSTONE)
EXISTING YEAR-ROUND QUARTERS (RETAINED)
WIDEN RADIUS FOR BETTER TURNING MOVEMENTS
EXISTING BUILDING RETAINED
ADD SCREENING
3 EXISTING YEAR-ROUND QUARTERS
[illegible]
YELLOWSTONE NATIONAL PARK ENTRANCE
EXISTING LEACH FIELD
YEAR-ROUND HOUSING 7 QUARTERS, 2 STORY SINGLE FAMILY HOMES WITH GARAGES 3 BEDROOM
COMMUNITY RECREATION FACILITIES INCLUDE: CENTER, PATIO, VOLLEYBALL, BASKETBALL & PARKING FOR 18 VEHICLES.
ADD VEGETATION TO SCREEN NEW PRIVATE DEVELOPMENT TO WEST
RELOCATED LOG STRUCTURES FROM POST OFFICE SITE (USED AS TWO YEAR-ROUND UNITS AND TWO GARAGES)

ALTERNATIVE TWO

YELLOWSTONE NATIONAL PARK

West Entrance Park Employee Housing

101 / 40315 / May 92

252

THREATENED AND ENDANGERED SPECIES

As stated in the Introduction, it is necessary to evaluate and assess impacts upon threatened and endangered species on a recovery area basis rather than on a community basis in order to be biologically meaningful. Therefore, the overall impacts upon the threatened and endangered species have been assessed based on recovery areas rather than on the impacts of the proposed actions on individual communities.

Affected Environment

There are no federally listed threatened or endangered plant species that occur in Yellowstone National Park.

ENDANGERED PEREGRINE FALCON

The peregrine falcon resides in Yellowstone from April through October, nesting on large cliffs that overlook rivers or valleys where prey is abundant. An interagency GYE Peregrine Falcon Working Group cooperates to implement the *Peregrine Falcon Recovery Plan* (Rocky Mountain population) signed in 1984. This plan called for determining and maintaining suitable habitat, monitoring and maintaining productivity of wild pairs, and restoring breeding populations where necessary. Preliminary surveys for peregrines and suitable habitat began in 1982, and hacking (peregrine reintroduction) began in 1984. In 1987, surveys and monitoring of reintroduced birds revealed that suitable nesting sites were being naturally reoccupied in the park. Thus, hacking ceased after 1988 because the habitat was thought to be saturated. Known peregrine aeries in the park have increased from one in 1984 to six in 1991. No aeries are known to occur in the immediate area at any of the nine HUDAT locations. The proposed actions will not affect the existence of the peregrine population.

ENDANGERED WHOOPING CRANE

The whooping crane is also a summer resident of Yellowstone. The whooping crane population in the greater Yellowstone ecosystem is centered around Gray's Lake National Wildlife Refuge in Idaho. This population is the result of a cross-fostering experiment initiated at Gray's Lake in 1975 in an effort to start a wild, self-sustaining flock of whooping cranes. Historical evidence of whooping cranes nesting in Yellowstone does exist, but the Yellowstone nesting information is sketchy and does not constitute a legitimate nesting record. At present, the whooping crane population in the park is extremely low and rarely, if ever, exceeds two individuals. These cranes summer in the southern half of the park, away from all nine of the HUDAT areas. The proposed actions will not affect the existence of the whooping crane population.

ENDANGERED BALD EAGLE

Bald eagles are both year-round residents and migrants in the park. Efforts to recover the bald eagle population in the greater Yellowstone ecosystem are well underway. A GYE Bald Eagle Working Group was formed in 1981 to help coordinate recovery efforts in the ecosystem. In 1983 the GYE agencies prepared and signed a *Bald Eagle Management Plan* for the greater Yellowstone ecosystem. The overall management objective for the greater Yellowstone ecosystem bald eagle population is to achieve and maintain 62 breeding pairs with a territorial occupancy rate of 85 percent annually. Each occupied territory should produce one young per year for a running five-year average of 53 young per year. As of 1989, a mean of 63.5 breeding pairs with a territorial occupancy rate of 88 percent was tallied, producing an average of 1.05 young per occupied territory. The U.S. Fish and Wildlife Service is reviewing the status of the bald eagle in response to a proposal to change its status to "threatened". Data indicate that bald eagle populations have met recovery goals for four of five regions, including the Pacific region which includes the greater Yellowstone ecosystem. Bald eagles do not nest, nor are they documented to regularly roost, in any of the nine project areas, although they may occasionally forage in these areas. The proposed actions will not affect the continued existence of the bald eagle population.

THREATENED GRIZZLY BEAR

Introduction

The only animal species present and listed as threatened in the park is the grizzly bear (*Ursus arctos horribilis*). The grizzly bear was classified in 1975 as threatened in the contiguous United States. Fewer than 1,000 grizzlies are thought to survive in six areas of Montana, Wyoming, Idaho, and Washington. In Yellowstone, recovery and management of the grizzly bear is of the highest priority and is mandated by the Endangered Species Act. The greater Yellowstone grizzly bear population is the second largest of the recovery populations and is estimated to have a minimum of 200 bears. The grizzly ranges over 5.5 million acres within the greater Yellowstone ecosystem, with nearly 40 percent of this range (2.2 million acres) within Yellowstone National Park.

Methods of Population Research and Monitoring

In 1973, the Interagency Grizzly Bear Study Team (IGBST) was established to continue research on grizzly bears and their habitat in the greater Yellowstone ecosystem. Objectives of IGBST studies are to determine the status and trend in the grizzly bear population, the use of habitats and food items by bears, and the effects of land management activities on the grizzly bear population (IGBST 1990). Study methods are reported by Blanchard (1985) and Mattson et al. (1991); the study area has been described in detail by Blanchard and Knight (1991) and Knight and Eberhardt (1985).

In 1983 an interagency committee was formed to ensure that the ecosystem was managed in ways that would help the grizzly bear population recover. The Interagency Grizzly Bear Committee (IGBC) includes representatives of the U.S. Fish and Wildlife Service, the U.S. Forest Service, the Bureau of Land Management, the National Park Service, and the fish and game departments of Idaho, Montana, Wyoming, and Washington. The *Grizzly Bear Recovery Plan* is the basic management document guiding the recovery effort; a revised recovery plan is now on review (USFWS 1990). Yellowstone's bear management program is directed toward preserving and maintaining the grizzly bear population as part of the park's native fauna, while providing for visitor safety.

In 1984 the IGBC Yellowstone Ecosystem Management Subcommittee adopted an objective of developing a methodology to quantitatively and qualitatively assess the cumulative effects of human activity on the grizzly bear and its habitat in the Yellowstone ecosystem. Subsequently, the U.S. Forest Service and the National Park Service jointly developed a computerized mathematical model called the cumulative effects model (CEM). The model was applied in the 1987 *Draft Environmental Impact Statement/Development Concept Plan* for the Fishing Bridge developed area. However, since then the IGBC subcommittee and the CEM modeling team have recognized that to make the model more usable, technological advances in computer application and database updates must be incorporated to take into account the effects of the 1988 fires. Updated scientific information, such as that related to bear use of spawning streams, also must be incorporated into the cumulative effects analysis. At this time, the cumulative effects model is not available to assess the relative merits of the alternatives in this plan (Richardson, pers. comm.).

However, the rationale behind the cumulative effects model lends itself to making a qualitative biological assessment of the impacts related to the proposed actions and alternatives for the nine HUDAT locations. The model recognizes two key factors influencing the potential recovery of the grizzly bear population in the Yellowstone ecosystem. These factors are the effectiveness of the habitat available to grizzly bears and grizzly bear mortalities. If sufficient habitat is maintained in the greater Yellowstone ecosystem to support a viable population of grizzlies, and if bear mortalities are minimized, especially those of breeding females, it should be possible to protect and potentially recover this threatened population.

In order to monitor the bear population trends and to meaningfully analyze the effects of use or development on locally affected bears, occupied grizzly bear habitat in the Yellowstone ecosystem has been divided into 18 grizzly bear habitat units (See Fig. 1). These habitat units were delineated based on the principle that each unit should contain a complete spring, summer, and fall habitat for grizzly bears. For most of the units, there is substantial evidence that the habitat contains adequate food sources to support grizzly bears in all three seasons. The nine HUDAT areas are located in seven different grizzly bear habitat units (Fig. 1).

Since 1959, intensive research has provided scientists and managers with a detailed portrait of grizzly bear life in Yellowstone (Craighead and Craighead 1971; Craighead, Craighead and Sumner 1976; Craighead, Sumner, and Scaggs 1982; Knight, Mattson, and Blanchard 1984; Knight and Eberhardt 1985; Blanchard 1986). Bear habitat and food use since the closing of major garbage dumps in 1971 have been studied by the IGBST and others (Forest Service, Basile 1982; Blanchard 1983; Graham 1978; Gunther and Renkin 1990; Harting 1985; Judd and Knight 1980; Kendall 1983; Knight, Mattson, and Blanchard 1984; Mattson and Despain 1985; Mattson, Knight, and Blanchard 1986; Mealey 1980; Schleyer 1983; Youmans 1979). This research has revealed numerous food preferences and activity patterns exhibited by grizzly bears in the Yellowstone ecosystem.

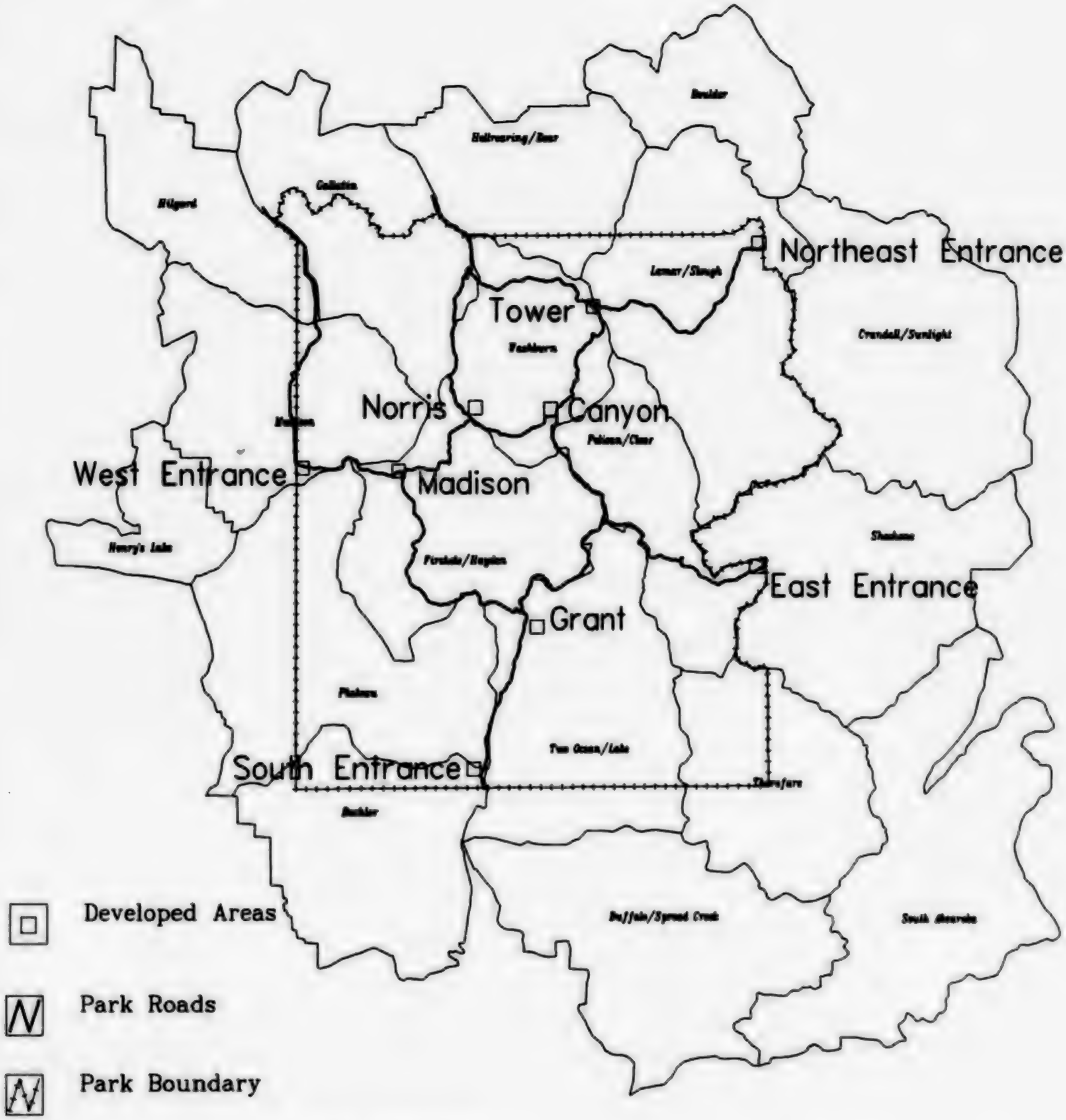
Grizzly bear food uses and preferences were determined by fecal analyses conducted between 1977 and 1983. During that period, 2,791 scats were collected while sampling habitat in areas where radio-instrumented bears were aerially located. This included 118 bears at 624 locations. Scat collection occurred throughout the bears' active seasons (March through November), though less effort was possible very early and very late in each year. Both feedsites and scats were carefully analyzed, and a series of indices were developed by which diet items were then ranked in nutritional importance to bears (Mattson, Blanchard and Knight 1991).

Habitat Effectiveness

The quality of food and the availability of cover are important components of habitat effectiveness. Another important component is the effect of disturbance

Developed Areas and Grizzly Bear Management Units (BMU)

YELLOWSTONE NATIONAL PARK



GIS Lab
101 / 40316 / May 92 *Yellowstone Park*

associated with human activities on grizzly bears' ability to use a specific habitat. Average habitat quality for grizzly bears can be compared for different areas. Pristine is a hypothetical condition in which no human developments or activities are present. Areas where vegetation has been altered by humans (for example, where trees have been cut or exotic plants have been introduced) are not truly pristine and have reduced habitat effectiveness for grizzly bears. Three fundamental factors in evaluating habitat effectiveness are the vegetation available in each season; protein sources (such as carrion in the spring or spawning fish); and the amount, type, and timing of human use in the area.

Human activity may affect grizzly bears by displacing them from an area or a food source that might otherwise be used in the absence of human activity. The degree of displacement depends on the type, timing, and intensity of human activity. The zone of influence of a particular human activity or development can also be affected by natural barriers for bears (such as heavy forest cover, hills, or ridges). The zone of influence around any existing park use or developed area is not a real line that affects bears in a uniform manner; rather the line fluctuates based on the season, the time and amount of human use, the quality and availability of bear foods at that time, and the nature of the bear(s) using the area. Data suggest that the park's major developed areas effectively displace bears from using those developed areas to the extent that would be expected if human activity was not present (Mattson and Henry 1987, Reinhart and Mattson 1990).

Population Status and Relationship to Recovery Goals

Instead of attempting to conduct a census of the entire bear population, scientists monitor reproduction and mortality to assess population trends. Females with cubs appear to be the most accurately countable segment of the grizzly population. Based on extensive research and monitoring of Yellowstone area grizzlies, the *Grizzly Bear Recovery Plan* (revised draft in preparation) proposes setting the following population goals by which the progress toward the recovery of the grizzly bear population can be monitored:

1. There should be 15 females with cubs-of-the-year annually over a running six-year average.

2. Fifteen of 18 bear management units should be occupied by sows with young, from a running three-year sum of observations, and no two of the unoccupied bear management units should be adjacent to each other.

3. Known mortality should not exceed seven total or two adult females annually, averaged over six years.

Since the breeding interval is at least three years, the sum of three successive years is considered to represent a minimal population of fully adult females (usually considered to be age six and older), and a running sum of these data provides a population index (Knight and Eberhardt 1985).

The main need for restoring or at least maintaining the Yellowstone grizzly population is to ensure high survival rates of adult females (Knight and Eberhardt 1985). The margin between population decline and stability is not likely to be much more than one or two prime-age female bears per year in total mortality (Knight and Eberhardt 1984). Since observed mortality must be assumed to be less than total mortality, minimizing adult female mortality is of primary importance.

As shown in Table 1, sightings of sows with cubs-of-the-year have increased in the latter half of the 1980s. This may be indicative of a population trend, or it may simply be a result of increased success of survey methods or sightability. Between 1985 and 1990, the six-year average of known human-caused mortality was 5.3 bears per year, with an average of 2.0 adult females per year. As indicated in Table 1, known adult female mortality averaged at or below target levels from 1983 through 1989, although 1990 was a poor year in this respect.

Impacts of Development on Grizzly Bears

The impact analysis focuses on grizzly bear mortality, a direct effect, and on habitat effectiveness, which can be both directly and indirectly affected by the proposed actions. The cumulative effects model, although designed to be applied at a large scale, implies in concept that a number of small, relatively incalculable impacts add up to measurable impacts. Conversely, numbers of small conservation measures, and reductions in human use, bear displacement, or trapping and removal, should also add up to measurable benefit to grizzly bears. At present, a working model is not available to estimate the impacts, positive or negative, of either management actions in a quantitative form. When the model is available, it must still be used in balance with a qualitative analysis based on the available data, published research, and the knowledge of experienced biologists and wildlife managers in the ecosystem. In this analysis of the effect of the proposed community development, we apply the rationale used to develop a cumulative effects model, the existing data, and a qualitative analysis to assess the effects of the proposed action on the grizzly bear population.

Table 1: Female Grizzly Bears with Cubs of the Year, 1973-1990

Year	Females	Cubs	Adult female deaths (all causes, known and probable)
1973	14	26	4
1974	15	26	4
1975	4	6	1
1976	16	30	1
1977	13	25	6
1978	9	18	1
1979	13	29	2
1980	12	23	1
1981	13	24	5
1982	11	20	4
1983	13	22	2
1984	17	30	2
1985	9	16	2
1986	25	48	2
1987	13	29	2
1988	19	40	2
1989	16	30	0
1990	24	57	5
1991	24	*43	*0

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* Figures are preliminary and subject to revision

Source: Interagency Grizzly Bear Study Team 1991.

Displacement

Bears tend to avoid humans, although they will forage for exotic and native foods in close proximity to humans. Bears, in general, exhibit the strongest avoidance of occupied frontcountry human facilities (Mattson 1990). Using existing radio-collared bears, their *observed* use of habitats in proximity to roads and developed areas was compared to *expected* use (Mattson, Knight, and Blanchard 1987). Observed bear use within 15 kilometers (km) of roads differed significantly from what was expected during all seasons. Observed bear use within 15 km of developments differed from what was expected only during summer and fall. Observed use approximated expected use within 2 km of developments in summer and within 1 km in fall. Use was less than expected between 2 and 5 km and 7 and 9 km during summer, and between 1 and 4 km and beyond 7 km in fall. Substantial apparent avoidance by all bears of developed areas was evident in summer. Avoidance of humans by bears was interpreted as taking two forms: 1) disruption of foraging activities that tend to maximize use of the most productive habitat within a zone; and 2) outright avoidance of areas near frontcountry facilities. Researchers suggested that bears tending to range closest to developments (< 5 km) were very likely habituated to humans and human facilities.

The presence of existing homes and residents already displaces bears from park developments. However, the proposed action would not significantly increase the area of development. The continued presence of employees in existing housing areas presents a need to constantly manage bear attractants, to educate staff and visitors, and to occasionally trap and translocate bears. Displacement is not an entirely negative effect, however, as bears who avoid developed areas have less chance of becoming a nuisance and, therefore, less chance of being trapped or removed.

Female bears with young, and subadult bears apparently used habitats near developments more than other bear sex and age classes, likely avoiding other adult bears. During spring, females apparently selected highly productive habitat and secondarily responded to the presence of humans. Avoidance of humans using roads and developments probably exacts a cost on the grizzly bear population. Adult female and subadult grizzlies appear to bear a disproportionate part of this cost. However, the extent of the effects on the population were not determined (Mattson, Knight, and Blanchard 1987).

Mortality

Since hunting is not permitted in Yellowstone National Park, nearly all human-caused bear mortality within park boundaries is the result of management actions taken against habituated or nuisance grizzly bears. Roadkills occasionally also contribute to grizzly bear mortalities.

Developed areas in and around the park have historically been population sinks (that is, sources of high mortality) for grizzly bears in the ecosystem (Craighead et al. 1988). In such areas of human use and occupation, a bear can become attracted to human foods (such as garbage or camp cooking), become used to being near humans and continue to seek out a readily available food source, or lose its natural fear of humans. These bears then pose a threat to humans or property. Adult females, females with young, and subadult males have been observed foraging nearest to humans, especially when rich native foods are at stake, become habituated (Mattson 1990).

Bears that persist in frequenting areas of human occupation pose a greater risk of injury to humans (Herrero 1985) and to themselves. Such bears are eventually trapped and translocated in order to remove the threat to human safety as well as to increase the odds of the bear's survival; however, the long-term success of bear translocations is questionable (Meagher and Fowler 1987). Experiments to date in conditioning bears to avoid roadsides and developed areas have been inconsistent in changing bears' long-term behavior patterns (Hammond et al. 1989), aversive conditioning may still hold promise as a management tool (Mattson 1990). If repeated experiments or translocations do not succeed in keeping an individual bear from presenting a high potential for bear/human conflict, the bear may be removed from the ecosystem. If a bear develops a history of conflicts or becomes a potentially unacceptable hazard to humans, it must be removed. A bear that is removed from the park, even to another ecosystem or to a zoo, is considered a "mortality" in the ecosystem.

TABLE 2: GRIZZLY BEAR TRAPPINGS/TRANSLOCATIONS
1970–1990

	1970-75		1976-80		1981-85		1986-90	
SUBDISTRICT	No.	%	No.	%	No.	%	No.	%
Mammoth	1	1	0	0	0	0	4[a]	13
Tower	4	3	0	0	0	0	6	19
Lamar/Northeast	0	0	0	0	0	0	0	0
Norris	1	1	2	7	0	0	0	0
Canyon	33	25	3	11	2	8	6	19
Lake[c]	53	40	14	52	15	63	10	32
East	0	0	0	0	0	0	3	10
Grant	11	8	0	0	4[b]	17	1	3
Snake(South)	0	0	0	0	0	0	0	0
Madison	4	3	0	0	0	0	1	3
Old Faithful	24	18	7	26	2	8	0	0
West	3	2	1	4	1	4	0	0
Total	134		27		24		31	

Source: Yellowstone National Park, Bear Management Office, 1990.

a. Female and three cubs-of-the-year were trapped together.

b. Including a female and two cubs-of-the-year trapped together.
c. Includes the Bridge Bay and Fishing Bridge areas.

This sequence of events has occurred in every developed area inside and outside the park. Despite an intensive garbage management and sanitation program that has been in effect in Yellowstone for two decades, there are still occasions when bears become attracted to human or natural foods in and near developed areas and become habituated to human presence. The number of bears that have been trapped and translocated for management purposes has declined substantially since the early 1970s (see Table 2). However, the goal is to keep management handlings and removals to a minimum.

Because a bear may become a nuisance bear (as defined by IGBC guidelines) as a result of incidents at several locations before it is removed from the ecosystem, its removal cannot be attributed only to the location from which it was ultimately removed. When a bear is first trapped, it is marked and usually relocated to a remote area. Therefore, it is more appropriate and more conservative to use the number of transfers, rather than the number of removals, from an area as a measure of the degree to which a given development contributes to bear mortality. A similar technique was used in an independent investigation by Povilitis (1987) to generate mortality risk indices for the entire Yellowstone ecosystem. Yellowstone keeps records on bear transfers and removals in the park by subdistrict, and an individual bear's history will include documentation of known incidents in and around specific developed areas (see Table 3). In 1991, there were only two grizzly bear trappings/ translocations parkwide, one from the Lake developed area and one from the Grant Village area. There were no management removals of grizzly bears from Yellowstone National Park in 1991.

Table 3: Grizzly Bear Management Removals
1970–1990

	1970-75		1976-80		1981-85		1986-90	
Subdistrict	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Mammoth	0	0	0	0	1	17	0	0
Tower	3	8	0	0	0	0	0	0
Lamar/Northeast	0	0	0	0	0	0	0	0
Norris	0	0	0	0	0	0	0	0
Canyon	7	19	0	0	1	17	1	25
Lake	12	32	2	40	3	50	3*	75
East	0	0	0	0	0	0	0	0
Grant	10	27	0	0	0	0	0	0
Snake(South)	0	0	1	20	0	0	0	0
Madison	1	3	0	0	1	17	0	0
Old Faithful	4	11	2	40	0	0	0	0
West	0	0	0	0	0	0	0	0
Total	37		5		6		4	

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* One of these bears also was involved in conflicts at Canyon, though the removal decision was based on conflicts primarily in the Lake area.

Source: Yellowstone National Park, Bear Management Office, 1990.

The number of grizzly bears trapped and translocated has remained fairly constant since 1976 (Table 2), as has the number of grizzlies removed from the park since 1976 (Table 3). The presence of existing homes and residents already displaces bears from developments. The replacement and addition of housing units and small numbers of residents will continue to contribute to this displacement and/or may slightly increase the mortality risk to bears in each of the housing areas. Bear mortalities related to park developed areas, in addition to unpredictable mortalities outside park boundaries, could slow the rate of grizzly population recovery.

Environmental Consequences

The nine existing housing/developed areas addressed in this plan are distributed in seven of the ecosystem's 18 Bear Management Units (BMUs) (see Fig. 1). While each of the nine locations is discussed separately, the combined effect of continued or increased human occupation in each BMU is important when considering the cumulative effects of human activity in bear habitat. Proposed conservation measures to accompany the proposed actions are presented together, following the area-specific analysis.

In this chapter, the size of acres to be disturbed may vary from the size of acres to be disturbed in the preceding chapters. The acreage of disturbance for wetlands, soils and vegetation can be defined with precise measurable boundaries. However, when assessing effects on grizzly bears, we can only generally define disturbance *zones*. Grizzly bears will not simply avoid the exact perimeter of a disturbed area. The bears generally will avoid the entire area of human occupation and travel or forage in the area of the nearest security or vegetative cover. Thus, the zone around proposed new construction which is disturbed or "lost" as grizzly bear habitat is less definable. It also tends to be larger than that acreage described for those resources with more precise boundaries of disturbance.

CANYON VILLAGE

The Canyon Village housing area is located in the Washburn BMU. This BMU, which also includes the Norris and Tower Junction housing areas, was occupied by one or more sows with cubs-of-the-year (COY) in 1988 and 1990. The Canyon NPS housing area is the only portion of the Canyon Village area affected by this plan, although it adjoins a large development of concession employee housing and visitor facilities, including a campground, visitor center/ranger station, lodge and cabins, stores, and restaurants. The area surrounding the development is considered to be good quality bear habitat, as bears travel from the slopes of the Washburn range around the Canyon area and to the meadows of Hayden Valley. Historically, Canyon has experienced a high level of bear observations and management actions, relative to other park developed areas. The number of bears being trapped and removed from the park (and ecosystem) has declined significantly between 1970 and 1990. However, between 1986 and 1991, six grizzly bears were trapped and translocated in the Canyon subdistrict. All six were trapped because of conflicts within the Canyon developed area, which includes the campground and lodging area as well as the employee housing/administrative area. A bear-caused human fatality occurred in 1986 in the subdistrict, and this bear was removed from the ecosystem. It is because of occasional instances such as this, that bears must sometimes be trapped and translocated away from human occupied areas. This need would occasionally occur in the Canyon area as well as in other developed areas. Securing bear attractants and education of employees and visitors would continue.

No-Action Alternative

As described under the proposal, the Canyon Village area has a long history of interactions with grizzly bears. Relative to other park developed areas, the likelihood of bears being trapped, translocated, and potentially removed remains fairly high here. Under the No-Action Alternative, data suggests that bears would continue to be displaced from all developed areas to some degree, and that females with cubs-of-the-year are particularly likely to exhibit this avoidance. Management of food, garbage, and other bear attractants, as well as education of park employees and visitors about living in bear country would continue.

The Proposal

The proposed action calls for replacing substandard quarters and building additional quarters, including some improved RV sites for seasonal and contractor employees in the Canyon housing area. At Canyon, an estimated 3.5 acres would extend the perimeter of the displacement zone outward from the existing development. Currently 45 NPS employees live in the area (10 year-round and 35 seasonal); the proposed action would accommodate a maximum of 61 employees (14 permanents and 47 seasonals) if eventual budget increases allow for future employees. At present, 64 RV sites exist, of which 37 are occupied.

The increase in number of employees may slightly increase the displacement and mortality risk to grizzlies attributable to the Canyon Village development. If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. This area is especially important to grizzlies in the fall, and efforts should be made to insure that the patterns and season of human residence do not substantially change.

The number of grizzly bears trapped and translocated has remained fairly constant since 1976 (Table 2), as has the number of grizzlies removed from the park since 1976 (Table 3). With continuation of the efforts currently established to minimize bear/human conflicts, and with implementation of the additional conservation measures addressed later in this chapter, it is reasonable to conclude that the number of bear management actions would remain fairly constant over the next decade. Bear mortalities related to park developed areas, in addition to unpredictable mortalities outside park boundaries, could slow the rate of grizzly population recovery.

Alternative One
In this alternative, approximately 0.5 acres of expansion on the periphery of the present development is estimated to occur due to housing replacement and additions. However, this plan would shift all permanent residents, currently near the entrance to the housing area and within 0.25 miles of the main park road, to the northwest edge of the development where a seasonal contractors' camp exists. This shift pushes the primary year-round hub of community activity to the outer edge of the development, closer to the slopes of the Washburn Range. The effects on bear displacement could be as great or greater than that of the proposed action, despite the smaller acreage attributed to this alternative. Other effects would be similar to that of the proposal.

Alternative Two
In this alternative, approximately 1.0 acres of estimated expansion outward of the development would occur, again causing overall effects to be similar to that of the proposal. Management of bears and humans remains necessary, and the potential for bear mortalities is not lessened.

EAST ENTRANCE

The East Entrance housing area is located in the Pelican/Clear BMU. This BMU was occupied by one or more sows with COY in 1988, 1989, and 1990. This area lies within what is categorized as good bear habitat, near the Absaroka Range. Grizzlies travel through this area between feed sites, such as those that exist along the elevational gradient between the forests along the Shoshone River and the high elevation whitebark pine stands and moth sites. Between 1986 and 1991, three grizzly bears were trapped and translocated from the East Entrance subdistrict. These bears were observed frequently near the park and its approach road from Cody, near commercial visitor accommodations several miles away at Pahaska Tepee, and near the park housing area. They were moved in an attempt to prevent the bears from becoming further habituated to humans, from being hit by vehicles, or from being attracted to human foods or garbage near any of the existing developments.

No-Action Alternative
The East Entrance housing area has existed for many years. This area provides both attractants to grizzly bears and displacement, due to bears' general avoidance of humans and human activity. Under the No-Action Alternative, data suggests that bears would continue to be displaced from all developed areas to some degree, and that females with cubs-of-the-year are particularly likely to exhibit this avoidance. However, bears may respond more to high quality food sources than to the human activity present in the area. Judging from past years, the East Entrance subdistrict would continue to be an area of

Yellowstone in which bears would occasionally frequent roadsides or be attracted to developed areas. Management of food, garbage, and other bear attractants as well as education of park employees about living in bear country would continue.

The Proposal

The proposed action calls for replacing substandard quarters and building new quarters, all within the existing housing area. No new disturbance would be on the periphery of the development. Replacement housing would be sited where trailers now exist to support 1 permanent and 6 seasonal NPS employees. While this small development lies in good bear habitat, the area of displacement would remain essentially unchanged by the proposal. The proposed action may eventually accommodate an increase in the number of residents, to 2 permanent and 9 seasonal employees, if budget for future staffing needs is ever available. This increase in community size likely would contribute to a slight increase in potential bear mortality. Conservation measures to help offset this loss are discussed under "Proposed Management Actions." If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. Efforts would be made to insure that the patterns and season of human residence do not substantially change. The continued presence of employees and visitors in this area presents a need to constantly manage bear attractants and to educate residents about living in bear country.

GRANT VILLAGE

The Grant Village housing area is located in the Two Ocean/Lake BMU. This BMU has been occupied by one or more sows with COY in 1988, 1989, and 1990. Grizzly bears prey on spawning Yellowstone cutthroat trout in Yellowstone Lake tributaries from early May until potentially mid-July. In recent years, increased use of spawning cutthroat trout as a spring food source for the grizzly has been documented (Reinhart 1990). Between 1985 and 1987, 93 percent of Yellowstone Lake's spawning tributaries had associated bear activity, and 61 percent had conclusive evidence of bear fishing. Research on grizzly bears' use of trout suggests that bears will continue to increase their spring use of spawning areas in and around Yellowstone Lake. This is probably due to a combination of factors: more conservative human fish harvests and a recovering fish population, a bear population weaned away from garbage dumps, and a possibly expanding grizzly bear population. Three spawning streams run through or adjacent to the existing housing development and campground area at Grant Village. This area is specially managed to minimize bear/human conflicts; the campground is closed until late June annually, and human access to stream corridors is restricted until monitoring indicates that bear use of spawning streams has ceased.

Between 1986 and 1990, one grizzly was trapped and moved from Grant Village; an additional subadult was trapped and translocated from the Grant area in 1991, but neither of these bears have been removed from the population. A subadult male grizzly died when apparently hit by a vehicle in 1990 in the Grant subdistrict. The bear appeared to be crossing the road in the vicinity of a spawning stream during trout spawning season. The Grant Village housing area is one of the park developed areas where repeated bear/human conflicts have arisen. This pattern has been noted for many years and likely reflects the higher quality habitat for grizzlies in this areas. Numerous management efforts have been underway in the past 15 years to minimize bear/ human conflicts in this area, and additional actions will be implemented as necessary.

No-Action Alternative

The Grant Village housing area has existed for many years, as have surrounding visitor use facilities including a hotel complex, stores, restaurants, service station, visitor center, ranger station, campground, and marina. This area provides both attractants to grizzly bears and displacement, due to bears' general avoidance of humans and human activity. Under the No-Action Alternative, data suggests that bears would continue to be displaced from all developed areas to some degree, and that females with cubs-of-the-year are particularly likely to exhibit this avoidance. However, bears may respond more to high quality food sources than to the human activity present. Judging from past years, the Grant Village area would continue to be an area of Yellowstone in which bears would be attracted, especially from May into July. Bears would occasionally have to be trapped and translocated from the area. Special measures have been implemented and would continue in an attempt to minimize impacts to the bear population and to reduce safety hazards to both bears and humans. Management of food, garbage, other bear attractants, and human access to spawning streams and bear travel corridors, as well as education of park employees about living in bear country, would continue.

The Proposal

The proposed action calls for replacing substandard quarters and building new employee quarters in two sections of the existing housing/administrative area. In the vicinity of the existing recreational vehicle (RV) site, an estimated 9.5 additional acres may be needed for RV site expansion. This would accommodate 16 additional RV sites for concession employees as well as considerably increasing the spacing of the 79 existing sites. Also in this area, approximately 4 acres of vacant ground covering an old dump site would be revegetated. In the area of concession housing, new construction would occur within the current zone of development. Approximately 1.5 acres would be expanded on the perimeter of the NPS housing area. The proposed action could accommodate a total of 66 NPS employees (14 permanent and 52 seasonal) if the budget eventually allows for future staffing needs; this is up from the 54 employees presently assigned to Grant (12 permanent and 42 seasonal). The increase in number of employees may slightly increase the displacement and mortality risk to grizzlies attributable to the Grant Village development. Conservation measures to help offset this loss are discussed under "Proposed Management Actions." If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. This area is especially important to grizzlies between May and July, and efforts would be made to insure that the patterns and season of human residence do not substantially change.

The continued presence of employees and visitors in this area presents a need to constantly manage bear attractants and human movements, particularly during spawning season. It also requires education of staff and visitors, and would result in park staff having to occasionally trap and translocate bears. The number of grizzly bears trapped and translocated has remained fairly constant since 1976 (Table 2), as has the number of grizzlies removed from the park since 1976 (Table 3). With continuation of the efforts currently established to minimize bear/human conflicts, and with implementation of the additional conservation measures addressed under "Proposed Management Actions," it is reasonable to conclude that the number of bear management actions would remain fairly constant over the next decade. Bear mortalities related to park developed areas, in addition to unpredictable mortalities outside park boundaries, could slow the rate of grizzly population recovery.

Alternative One

In this alternative, the concessioner RV site area would increase by an estimated 9.5 acres. In the same vicinity, an estimated additional 3.5 acres would support new construction of dormitories. In the NPS housing area, approximately 0.5 acres on the periphery of the existing development would be needed for new housing. In the borrow site southwest of the Ranger Station, an additional 5.5 acres would support employee housing. Thus, an estimated total of 19 acres of growth on the periphery of the existing developments would occur, resulting in additional loss of grizzly bear habitat, and displacement of bears from the area. Due to the increased number of employees and the increase in activity in the RV site area, bear use of spawning fish in Sewer Creek, less than 0.3 mile from the existing RV park, would also be negatively affected.

Effects on bear displacement and mortality would be similar to that described under the proposal. It is expected that Grant Village would continue to be a site of periodic bear trappings, translocations, and potential removals. While efforts are made to keep this to an absolute minimum, this risk would never be reduced to zero, particularly with increased growth and occupation by residents.

Alternative Two
Under this alternative, approximately 1.5 acres in the existing NPS housing area would be expanded outward, and the existing mobile home sites would be replaced by seasonal NPS housing. This additional acreage being added to the periphery of the development and growth in the number of residents would have a similar effect on bear displacement and mortality as that described under the proposed action. Grant Village would continue to be a site of periodic bear trappings, translocations, and potential removals. While efforts are made to keep this to an absolute minimum, this risk will never be reduced to zero.

MADISON JUNCTION

The Madison housing area is located in the Firehole/Hayden BMU. The area surrounding the Madison housing area and adjacent campground includes the Gibbon and Madison river valleys. Due to the presence of riparian vegetation and wintering elk and bison, this area attracts bears, particularly in spring when some ungulate winterkill is present. Grizzlies are occasionally seen in the area. This BMU was occupied by one sow with COY in 1988 and 1989, and two sows with COY in 1990. Between 1986 and 1991, one grizzly was trapped and translocated from the Madison subdistrict, although it was not removed from the park. The area has experienced low incidence of bear trappings and removals from 1970 through 1991 (see Tables 2 and 3), but as with other housing areas, the potential remains for bears to occasionally be attracted to garbage or other foods and become habituated to human behavior or subject to vehicular accidents. This requires continued management of bear attractants and education of residents and visitors.

No-Action Alternative
The Madison housing area and campground have existed for many years. This area provides both attractants to grizzly bears and displacement, due to bears' general avoidance of humans and human activity. Under the No-Action Alternative, data suggests that bears would continue to be displaced from all developed areas to some degree and that females with cubs-of-the-year are particularly likely to exhibit this avoidance. However, bears may respond more to high quality food sources than to the human activity present. This would most likely occur in spring, prior to the opening of the campground and the influx of seasonal employees in late May or early June. In the period 1970-1991, the Madison subdistrict experienced occasional instances of bears that required management action, and this possibility remains, although the incidence is relatively low compared to other developments in the park. Management of food, garbage, and other bear attractants as well as education of park employees and visitors about living in bear country would continue.

The Proposal

The proposed action calls for replacing substandard quarters and building new housing in the existing housing area, an estimated 0.5 acres of which is on the periphery of the development. The projected maximum number of employees would increase from 25 (5 permanents and 20 seasonals) to 30 (9 permanents and 21 seasonals) if the budget eventually allows for future staffing needs. Efforts have been made to confine the development as much as possible to the existing developed zone in order to minimize habitat loss as a result of the proposal; however, a slight increase in new disturbance on the periphery of the development would occur in order to improve living conditions and add a community center. This may slightly increase the displacement of bears attributable to the Madison housing area. Conservation measures to help offset this loss are discussed under "Proposed Management Actions." If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. Efforts would be made to insure that the patterns and season of human residence do not substantially change from what currently exists.

Alternative One

In this alternative, an estimated additional 1 acre would be added on the west side of the development. This may slightly increase the displacement of bears attributable to the Madison campground and housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/human conflicts. Overall effects of this alternative on grizzly bears would be similar to those attributed to the proposed action, but the perimeter of the development expands even more under this alternative.

Alternative Two

This alternative would result in an estimated additional 0.5 acre of increased development on the periphery. This may slightly increase the displacement of bears attributable to the Madison campground and housing area. As discussed under the proposed actions, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/human conflicts. Overall effects of this alternative on grizzly bears would be similar to those attributed to the proposed action.

NORRIS

The Norris housing area, like Canyon and Tower, is located in the Washburn BMU, which was occupied by one or more sows with COY in 1988 and 1990. The Norris area is not known for high numbers of bear observations or radio-locations, but due to the proximity of wintering ungulates near the Norris Geyser Basin, bears may be attracted to the area in spring. No grizzly bears were trapped or translocated from the Norris subdistrict between 1986 and 1991, nor in the previous five-year period. No grizzlies were removed from Norris between 1970 and 1991.

No-Action Alternative
Grizzly bears are seldom seen in the vicinity of the housing area, and data indicates a low incidence of bear/human conflicts in the Norris area. This housing area contributes to the loss of grizzly bear habitat and potential bear displacement, but some level of this has occurred for the decades in which employees have lived at Norris. Management of food, garbage, and other bear attractants, and education of park employees and visitors about living in bear country would continue.

The Proposal
The proposed action calls for replacing substandard quarters and building additional quarters in the existing housing area. There would be an estimated 3.5 acres of growth on the periphery of the development. The maximum number of potential employees housed there would be 19 (4 permanent and 15 seasonal) if the budget allows for future staffing needs, a slight increase over the present number of 12 employees (3 permanent and 9 seasonal). Efforts have been made to confine the development as much as possible to the existing developed zone, to minimize habitat loss as a result of the proposal; however, some growth in the size and number of residents in the community would occur. This may slightly decrease the habitat effectiveness in the Washburn BMU. Conservation measures to help offset this loss are discussed under "Resource Management Actions." As in other park developed areas, staff will constantly manage bear attractants, educate staff and visitors, and potentially occasionally trap and translocate bears, although the data suggest this would not occur at Norris.

Alternative One
In this alternative, an estimated 1 acre of expanded growth would occur. This may slightly increase the effects on bears attributable to the Norris housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/ human conflicts. Overall effects of this alternative on grizzly bears would be very similar to those attributed to the proposed action.

Alternative Two
This alternative would increase development by an estimated 1.5 acres on the periphery of the existing housing area. Overall effects of this alternative on grizzly bears would be very similar to those attributed to the proposed action.

NORTHEAST ENTRANCE

The Northeast Entrance housing area is located in the Lamar/Slough BMU. The BMU contains high quality grizzly bear habitat and was occupied by one sow with COY in 1988, two in 1989, and three in 1990. The situation here is somewhat similar to that of the West Yellowstone area. The NPS housing area is within 0.5 mile of the park border town of Silver Gate, Montana; three miles away is Cooke City, Montana. These communities historically experienced high levels of grizzly bear activity and mortality. The data indicating no grizzly bears trapped or removed from the NPS housing area (Tables 2 and 3) is somewhat misleading, as numerous bears have been trapped just outside the park as a result of bear attractants throughout all of these communities. However, the NPS housing area improved storage of food and garbage long before the town of Cooke City completed fencing of the local dump. Management of bear attractants and education of residents and visitors is extremely important in these isolated communities.

No-Action Alternative

As described under the proposal, the Cooke City-Silver Gate area near the NPS Northeast Entrance housing area, has a long history of interactions with grizzly bears. The effects on the bear population, seen over the past two or three decades, has been substantial in terms of bear displacement and mortality. The communities' continued existence affects the bear population, despite significant and laudable recent progress in minimizing bear/human conflicts and bear mortalities. Because humans live, work, and recreate in the Yellowstone ecosystem, long-term management of humans and bears, including habitat improvement and occasional removal of habituated or nuisance grizzly bears, would continue as private individuals and government agencies strive to conserve the grizzly bear population. External activities, such as the proposed development of a large mining complex within three miles of Yellowstone's boundary, would contribute to the cumulative effects of growth in this area on the grizzly bear population and its habitat.

The Proposal

The proposed action calls for replacing substandard quarters or building new quarters in the existing housing area, of which an estimated 1.5 acres is new disturbance on the northern perimeter of the housing area. The maximum number of employees that could be housed at Northeast Entrance, if the budget allows for future staffing needs, is 10 employees (3 permanent and 7 seasonal); 8 employees presently can be housed there (3 permanent and 5 seasonal). This may slightly increase the displacement of bears attributable to the Northeast Entrance housing area. Conservation measures to help offset this loss are discussed under " Proposed Management Actions." If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. Efforts would be made to insure that the patterns and season of human residence do not substantially change from what currently exists.

Alternative One

In this alternative, an estimated 1 acre of expansion would occur on the western edge of the housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/human conflicts. Overall effects of this alternative on grizzly bears would be similar to those attributed to the proposed action, but the perimeter of the development expands even more under this alternative.

SOUTH ENTRANCE

The South Entrance housing area is located in the Bechler/Teton BMU. The Bechler/Teton BMU is characterized by very little grizzly bear use. This BMU has not been occupied by sows with COY. No grizzly bears were trapped or translocated from the Snake River subdistrict between 1986 and 1991, nor in fact since 1970. Although the subdistrict contains some high quality bear foods, bears are seldom seen in the vicinity of the housing area.

No-Action Alternative

Long-term effects of the No-Action Alternative would not substantially differ from that of any of the alternatives, since the number of area residents is not expected to increase. Since grizzly bears are seldom seen in the vicinity of the housing area, and sows with cubs have not been seen in this BMU, the slight additional habitat loss due to any additional development is not likely to change this situation. However, conservation measures to help offset this loss of habitat in this BMU are proposed and discussed under "Proposed Management Actions."

The Proposal

The proposed action calls for replacing and/or building new employee quarters in the existing housing area. The projected maximum number of employees would remain the same as the existing number: 5 permanent employees and 12 seasonal employees. Efforts have been made to confine the development as much as possible to the existing developed zone in order to minimize habitat loss as a result of the proposal; however, an estimated 1 acre of new disturbance on the periphery of the development would occur in order to improve living conditions and to add a community center. This may slightly increase the displacement of bears attributable to the South Entrance housing area. Conservation measures to help offset this loss are discussed under "Proposed Management Actions."

The continued presence of employees in this housing area presents a need to constantly manage bear attractants, to educate staff and visitors, and potentially to occasionally trap and translocate bears, although the data suggest this would not occur at South Entrance.

Alternative One

This alternative would result in an estimated 1.0 acre of increased disturbance on the periphery of the development. This may slightly increase the displacement of bears attributable to the South Entrance housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/human conflicts. Overall effects of this alternative on grizzly bears would be very similar to those attributed to the proposed action.

Alternative Two

This housing area design would result in an estimated 0.5 acre of increased disturbance on the periphery of the development. This may slightly increase the displacement of bears attributable to the South Entrance housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/ human conflicts. Overall effects of this alternative on grizzly bears would be very similar to those attributed to the proposed action.

TOWER JUNCTION

The Tower/Roosevelt area, like Canyon and Norris, is located in the Washburn BMU, which was occupied by one or more sows with COY in 1988 and 1990. Adjacent to the Tower NPS housing area is the Roosevelt Lodge and cabins, a horse corral which provides rentals and stagecoach rides for visitors, a small store, and a gas station. This development lies at the northern edge of the Washburn Range, which contains high quality bear habitat and in which grizzlies are frequently located. The area also lies on the edge of Yellowstone's northern range, which contains large numbers of ungulates year-round, and a variety of bear foods and cover. Between 1986 and 1991, six grizzly bears were trapped and translocated from the Tower subdistrict. Although four of the bears trapped in the Tower subdistrict were bears that frequented close to heavily traveled roads, only one of the six was removed from or because of conflicts in the Tower developed area. None of the Tower subdistrict bears became management removals. Nevertheless, this area presents a moderately high potential for existing and additional human activity to displace grizzlies, and a potential source of bear trappings and mortalities.

No-Action Alternative

The Tower/Roosevelt area has existed for many years. This area does provide attractants to grizzly bears but most bears likely avoid the development because of humans and human activity. Under the No-Action Alternative, data suggests that bears would continue to be displaced from all developed areas to some degree, and that females with cubs-of-the-year are particularly likely to exhibit this avoidance. Bears may respond more to high quality food sources than to the human activity present. The Tower/Roosevelt area would continue to be an area of Yellowstone to which bears would be attracted, and occasionally require trapping and translocation. Special measures have been implemented and would continue in an attempt to minimize impacts to the bear population and to reduce safety hazards to both bears and humans. Management of food, garbage, and other bear attractants, and education of park employees, would continue.

The Proposal

The proposed action calls for replacing substandard quarters and building additional quarters in the existing housing area, and in the vicinity of the Roosevelt Lodge where concession employees are now housed. There would be an estimated 2.0 acres of growth on the periphery of the development. If the budget allows for future staffing needs, the maximum number of potential employees housed here would be 29 (4 permanent and 25 seasonal), compared to the present staffing level of 19 employees (3 permanent and 16 seasonal). The concession employees housing could potentially accommodate an increase of 20 employees, to a total of 136. The increase in number of employees may slightly increase the displacement and mortality risk to grizzlies attributable to the Tower/Roosevelt development. If the duration of seasonal occupancy changes and significantly increases the number of employees in the spring and fall, the effects on wildlife displacement would be even greater. Efforts would be made to insure that the patterns and season of human residence do not substantially change.

Alternative One

In this alternative, an estimated 5.5 acres of expansion would occur on the periphery of the development. The existing horse corral area would be replaced with a large parking area and dormitory complex for concession employees. The corral would be moved west, between its existing location and the Roosevelt entry road, onto presently undeveloped ground, but within the periphery of the development. Approximately 3.6 acres on the southern edge of the existing housing area, and between the present bunkhouse and Lost Creek, would be added to the development. Overall effects of this alternative on grizzly bears would be similar to those attributed to the proposed action, but the development expands even more under this alternative.

Alternative Two

This alternative combines all employee housing, both concessioner and NPS, into the existing NPS housing and administrative area; this would separate employees from the visitor use area at Roosevelt. This results in an estimated 4.0 acres of expansion on the periphery of the housing area west of Lost Creek. Overall effects of this alternative on grizzly bears would be similar to those attributed to Alternative One.

WEST ENTRANCE

The West Entrance housing area is located in the Madison BMU, immediately adjacent to the town of West Yellowstone. This town and other park border towns were historically high sources of grizzly bear mortality in the ecosystem (Craighead et.al 1988), but this situation improved considerably in the 1980s. The town fenced its garbage dump, installed bear-resistant trash containers, and participated in education of its residents and visitors about the problems of living in bear country. Table 2 indicates a decline in the number of grizzlies that were trapped and translocated from the NPS housing area from 1970 to 1990. No bears were removed from the West subdistrict of Yellowstone, although the park participated in trapping bears in other locations around the community (bear traps are set where conditions are safest for humans and bears). The presence of the town and area roads affects the bear use of this area, although the subunit does contain some high quality habitat. No sows with COY were known to occupy the Madison BMU in 1988, but one was monitored in both 1989 and 1990.

No-Action Alternative

As described under the proposal, the West Yellowstone area, which includes the NPS West Entrance housing area, has a long history of interactions with grizzly bears. The effects on the bear population, viewed over the past two or three decades, has been substantial in terms of bear displacement and mortality. The developments' continued existence affects the bear population, despite significant and laudable recent progress in minimizing bear/human conflicts and bear mortalities. Because humans live, work, and recreate in the Yellowstone ecosystem, long-term management of humans and bears, including habitat improvement, would need to continue as individuals and government agencies strive to conserve the grizzly bear population.

The Proposal

The proposed action calls for replacing substandard quarters, relocating other structures, and building new structures in the existing housing area. An estimated 6.5 acres of new construction would extend the periphery of the development zone outward to the south and east. The maximum number of NPS employees would increase from 15 (7 permanent and 8 seasonal) to 26 (17 permanent and 9 seasonal) if the budget eventually allows for future staffing needs. The possibility remains that bears may be attracted to food or garbage in the area, and this requires continual monitoring and education of residents. Plans are underway for development of an 87-acre private development immediately outside the park, west of the NPS housing area; the proposed development includes a hotel-commercial business complex, an IMAX theater, and a 20-acre display featuring live, enclosed grizzly bears and associated natural history interpretation. The potential presence of captive bears requires strong fencing and other security measures, as well as intensive management of bear attractants. The small amount of projected growth, while unlikely to significantly displace bears given the existence and growth of the town of West Yellowstone, does contribute to the cumulative loss of habitat for bears in the ecosystem. Conservation measures to help offset this loss are discussed under "Proposed Management Actions."

Alternative One
This alternative would result in a growth of approximately 4 acres on the periphery of the development. This alternative includes siting of 20 concession employee dormitory rooms. (These employees are housed in the town of West Yellowstone in the proposed action.) This may slightly increase the displacement of bears attributable to the West Entrance housing area. As discussed under the proposed action, the continued presence of employees presents a constant need to educate staff and visitors and minimize bear/human conflicts. Overall effects of this alternative on grizzly bears would be very similar to those attributed to the proposed action.

Alternative Two
This alternative would result in an estimated 4 acres of growth on the southern and western sides of the existing housing area. Seasonal mobile home sites would be located in the existing NPS horse corral area. Overall effects of this alternative on grizzly bears would be similar to those attributed to the proposed action, but the development expands even more under this alternative.

Proposed Management Actions to Reduce Impacts of the Proposed Actions on Grizzly Bears

The management of conflicts between bears and humans has the highest priority in Yellowstone National Park. The National Park Service desires to keep the number of bear translocations and removals to an absolute minimum, recognizing that it is not likely that these events would ever be reduced to zero.

One of the primary goals of the housing initiative is to improve employee living conditions parkwide, while minimizing the disturbance to park resources. Attempts were made to place all proposed new and/or replacement housing within the perimeter of existing housing areas where the area is already of considerably reduced habitat effectiveness to bears due to the existing buildings and associated human activity. However, in order to provide for less crowded living conditions, some proposed housing has been located on the periphery of the existing housing areas. This does increase the zone of bear displacement outward to some degree. As stated earlier in the chapter, the acreage calculated for bear displacement should not be confused with the acreage calculated for ground disturbance due to the proposed construction or with the acreage of the current existing development. Grizzly bears will not simply avoid the exact perimeter of a building. Bears will generally avoid the entire area of human occupation and travel or forage in the area of the nearest security or vegetative cover. Therefore, bear displacement acreage tends to be larger than the actual construction disturbance acreage. Conversely, it does assume that vacant acreage well within an existing drainage area is already of decreased habitat effectiveness to bears. Thus, acreage where ground breaking occurs in a vacant green space well within the perimeter of a housing area is not calculated to decrease grizzly bear habitat effectiveness.

The acreage in the following table is the estimated zone of bear displacement for the proposed developments described by Bear Management Unit:

BMU	Acreage
Pelican/Clear	0.0
Washburn	9.0
Bechler/Teton	1.0
Two Ocean/Lake	11.0
Firehole/Hayden	0.5
Madison	6.5
Lamar/Slough	1.5

To help offset the loss of habitat effectiveness caused by the existing developments and the proposed actions, the following actions are proposed. Actions to offset habitat loss should occur in the same Bear Management Unit as does the planned disturbance. These actions are addressed by BMU. Any actions proposed to offset potentially increasing mortality risks are addressed on both a site-specific and a parkwide basis. During the past decade, a number of actions have already been undertaken to restore grizzly bear habitat and to reduce human-caused mortality of bears. These measures will continue to be of the highest priority to Yellowstone National Park.

All management actions related to these proposals would be commensurate with the actual disturbance due to the development and would occur as close to the development disturbance as possible. Implementation of the management actions would be phased in commensurate with the level of the development occurring each year.

Some management actions, such as rehabilitation of gravel quarries, would be done in conjunction with other major concurrent projects proposed for the park, including the Parkwide Road Reconstruction Plan, which will likely provide funding to accomplish this rehabilitation. Implementation of these actions would proceed in phases commensurate with the development of the proposed housing project.

Exotic plant infestations are considered a serious threat to the Yellowstone ecosystem, and the control of identified infestations is considered acceptable habitat improvement within the context of National Park Service policy. Serious infestations of such exotic plants as leafy spurge, knapweeds, mullein, berteroa, Canada thistle, houndstongue, and others displace native plant species. These displace native plants would be consumed by herbivores and perhaps by bears, whereas many of the exotic plants, such as knapweeds, are not palatable to elk and other grazers. These exotic infestations thus indirectly affect the grizzlies' ungulate prey base.

The ground disturbance from the proposed construction has a high probability of facilitating establishment of exotic plants at the development sites. This can occur either through the disturbance of the on-site seed bank or by introducing seeds of exotic species inadvertently transported to the site on equipment, etc. If exotic plants are introduced into the area, over time they will cause a decline in grizzly bear and ungulate forage and, consequently, a loss of grizzly bear habitat.

Appropriate management actions would be taken to prevent exotic plant introduction and establishment. Two percent of actual building costs would be set aside for control and prevention of exotic plant infestations. The park would use an Integrated Pest Management (IPM) approach to control the exotic plants.

Four of the affected BMUs would have 1.5 acres or less of new construction on the perimeter of the existing housing areas. In these BMUs--the Bechler/Teton, Lamar/Slough, Firehole/Hayden, and the Pelican/Clear--the park would initiate habitat improvement by controlling exotic plant species. The control would be performed in construction sites and in other locations where the native vegetation provides high quality natural bear food(s).

In the Madison BMU, an estimated 6.5 acres would be affected by growth in the West Entrance NPS housing area. This area is located adjacent to the town of West Yellowstone, which historically had high numbers of bear trappings, translocations, and removals. However, in the past 10 years, management of garbage and other bear attractants has been a high priority, and the number of bear incidents in town has been greatly reduced. Habitat improvement through exotic plant control has and would continue to be a high priority in this area, particularly along the West Entrance road and the park boundary line north of West Yellowstone. Dozens of acres of exotic plants are controlled annually to help prevent the loss of native forage species. At the Soldier's Pit service area, efforts to cleanup approximately 1 acre of disturbance have begun and would continue in an effort to encourage natural revegetation of the site.

In the Washburn BMU, an estimated 9 acres on the perimeter of existing zones of displacement at Tower, Canyon, and Norris housing areas would be affected. The Ice Lake pit (13.8 acres) would be reclaimed and restored to a semblance of its natural condition. This former gravel quarry has been disturbed since the 1960s. This area would be designated as a disposal area for excess materials from the proposed construction projects. When reclamation is completed, the service road would also be closed and allowed to revegetate.

The Yancey's Hole cookout site is used in the summer for cookouts associated with commercial use at Roosevelt Lodge. In the past, bears have occasionally been attracted to the site, and in 1990 a grizzly bear had to be trapped and translocated from the cookout site. The cooking grills and other bear attractants would be secured in a locked, log building at the site or transported from the cookout site back to Roosevelt each night. A bear-proof horse feed and garbage storage area would be constructed at the Roosevelt and Canyon concessioner horse corrals and barns. Bears have occasionally gotten into the existing facilities and obtained grain. The existing ash cans used outside the Roosevelt Roughrider cabins would be replaced with unlined bear-proof garbage cans and signed to prevent visitors from using the cans to dispose of trash. At the Roosevelt Hamilton Store, additional bear-proof garbage cans would be placed to handle trash overflow from inside the store.

In the Two Ocean/Lake BMU, construction would occur on approximately 11 acres on the edge of the existing housing areas at Grant Village. At the RV sites, where storage space for mobile home residents is minimal and barbecue grills and equipment are often left outside, bear-resistant storage boxes would be provided. East of the RV sites, vegetative screening would be increased to discourage residents from walking toward Sewer Creek where bears fish for spawning trout. Screening also would be increased in the main NPS housing area, between the development and Sandy Creek. Near the area of proposed RV site expansion is an old dump site that has been filled in and leveled. However, the area remains nearly devoid of vegetation, surrounded by forest cover. Approximately 4 acres here would be revegetated.

In the West Thumb area, the service road and former Civilian Conservation Corps camps and administrative site (approximately 5 acres) would be rehabilitated and restored to its natural condition. Elimination of structures and stored materials has already been accomplished at this site, and regular administrative use has ceased.

A nearby area, Little Thumb Creek, is an area where bears seek spawning fish and are observable in spring and early summer. Although this locale is not in the same BMU as the Grant Village area, vegetation would also be planted and/or barrier rocks placed along the now-removed pulloff at Little Thumb Creek. Bears fish dangerously close to the main park roadway here, which has resulted in one grizzly bear being hit by a car in recent years and another being trapped and relocated.

Along the road, "Slow - Wildlife Crossing" signs would be placed, on an experimental basis, in the vicinity of Little Thumb Creek and other locations where bears are known to cross park roadways and chance being hit by a vehicle.

Habitat improvement in the form of exotic plant control would occur in the Grant Village and West Thumb areas where there are serious infestations of Canada thistle and some invasion by knapweeds and other non-native plants. Monitoring and mapping of exotic plants has already begun; control using IPM methods would be increased in the future.

In the backcountry along the shores of Yellowstone Lake, a number of boat dock sites have historically had picnic tables and garbage cans provided. These facilities, besides being anomalous in the unroaded backcountry, provided potential bear attractants as the sites were infrequently serviced and cleaned up. The tables and garbage cans are being removed from the Wolf Point, Eagle Bay, and Plover Point areas; all of these sites are along the lake shoreline which is used by grizzlies as a travel corridor.

In all housing areas, efforts to educate visitors, employees and their families about bears would continue and would be continually updated as necessary. If the average length of season that temporary employees occupy the housing area changes, the effects on wildlife displacement would increase. Efforts would be made to ensure that the patterns and season of human residency do not substantially change.

Conclusion

The overall trends in grizzly bear production and survival, as indicated by population monitoring in relation to the ecosystem-wide goals, appear positive in the short-term. The proposed actions of expanded construction and human presence in park housing and administrative areas are in areas already having an affect upon grizzly bear movement, behavior, and potential mortality. However, by confining the additional construction and residency of employees to these areas, the added impact on grizzly bears and their habitat to these zones of displacement would be minimized. A number of measures are planned to offset the negative cumulative effects of this planned growth on the bear population and its habitat. Even though these measures would not reduce the effects of the proposed actions to zero, their combined effect is not likely to adversely affect the existence of the grizzly bear population in the ecosystem.

CANDIDATE SPECIES

A number of plant and animal species are currently listed by the U.S. Fish and Wildlife Service as Category 2 species. Category 2 species are species that are potentially candidates for listing as threatened or endangered because there is some evidence of vulnerability, but for which there is not enough data to support listing proposals at this time.

Species Known to be Present in Yellowstone

The lynx (*Felis lynx*) and the wolverine (*Gulo luscus*) are mid-sized carnivores which are generally believed to range in the greater Yellowstone ecosystem. The lynx breeding status in the park is uncertain, though sightings have been reported over the course of the park's history. It is generally impossible to verify the reliability of sightings, particularly since the similar looking bobcat (*Felis rufus*) is present. Some evidence exists to suggest that a breeding population of wolverine exists in the greater Yellowstone ecosystem, though abundance and distribution are undocumented for this species as well. These two carnivores are wide-ranging, generally solitary in nature, and prey or scavenge on other small mammals. Small scale, site-specific ground disturbances such as those involved in these nine proposals should not affect the population status of these carnivores.

The spotted bat (*Euderma maculata*) has not been documented in Yellowstone but could exist here. The Western big-eared bat (*Plecotus townsendi*) has been collected in the Mammoth area, and likely is widely distributed in the park, although it has not been studied here. This bat generally lives in caves, which do not exist in any of the nine project areas. The only recorded specimen of Preble's shrew (*Sorex preblei*) in the greater Yellowstone ecosystem was collected at the Lamar Ranger Station; again, no information exists on its distribution or abundance in the park. Small scale, site-specific ground disturbances such as those involved in these nine proposals should not affect the population status of these small mammals.

The Arctic grayling (*Thymallus arcticus*) exists in several lakes in Yellowstone. A fluvial form of the Arctic grayling, living entirely in riverine habitats, historically occurred in the Madison River drainage and below the falls in the Firehole and Gibbon rivers. The fluvial Arctic grayling is now very rare in the upper Missouri River basin and may no longer occur in Yellowstone. The park is therefore considering a plan to restore fluvial Arctic grayling in several streams. None of the candidate streams are in any of the nine project areas, nor should they be affected by the proposed actions.

The U.S. Fish & Wildlife Service has recently received a petition to list the trumpeter swan (*Cygnus buccinator*) as a threatened species. The greater Yellowstone ecosystem trumpeter swan population has fluctuated dramatically in recent years. Areas within and outside the park provide habitat for both resident and migratory trumpeters. In Yellowstone, the summer nesting population is extremely low and rarely exceeds 45 swans. In the winter, due to an influx of migrant trumpeter swans from the northern latitudes and elsewhere in the greater Yellowstone Ecosystem, the population can vary from 60 to several hundred individuals. Park staff participate in the greater Yellowstone ecosystem Trumpeter Swan Working Group, which shares management concerns and programs in the region. Regular monitoring activities include a spring nesting survey flight, a late summer productivity flight, and participation in a winter tri-state swan survey, which counts migrant and resident trumpeter swans. No swans nest or forage in the vicinity of any of the nine project areas, and these proposals would not affect the status of the population.

Other Category 2 bird species include the ferruginous hawk (*Buteo regalis*), an uncommon migrant, the mountain plover (*Charadrius montanus*), the long-billed curlew (*Numenius americanus*), and the burrowing owl (*Athene cunicularia*), all of which are rarely recorded in the park. The small scale, site-specific actions associated with these nine proposals should have no effect on the population status of these bird species.

Ross' bentgrass (*Agrostis rossiae*) is a Category 2 plant species endemic to Yellowstone National Park. A truly unique habitat in the park is that which surrounds the thermal areas; this is where Ross' bentgrass is found. In the early 1980s, the U.S. Fish and Wildlife Service proposed listing Ross' bentgrass as an endangered species. This led to a survey of the location of additional populations of Ross' bentgrass in the park. Currently, there is a dated Memorandum of Understanding between the U.S. Fish and Wildlife Service and the National Park Service which specifies that the park continue actively monitoring and protecting Ross' bentgrass in lieu of federal listing. Ross' bentgrass is known to occur only in the Upper, Lower, Geyser Basin and Midway Geyser Basins along the Firehole River. The vicinity around Norris is the only site associated with these proposals that potentially contains habitat for Ross' bentgrass, although it is not known to occur there.

CUMULATIVE EFFECTS ANALYSIS

As explained in the "Purpose of and Need for the Plan", community planning in the nine HUDAT areas addresses the need for new and upgraded housing to address winter and shoulder season needs and to improve employee morale in order that the areas may better serve the needs of park visitors.

An analysis of the cumulative effects due to the implementation of the proposed actions includes existing development and management actions. Consideration is also given to any reasonably foreseeable future actions. This analysis considers the Lake Village/Bridge Bay Development Concept Plan; a 20-year project for the reconstruction, resurfacing, restoration, and rehabilitation of major roads in Yellowstone; a study to replace campsites affected by the closure of the Fishing Bridge campground; the Wildland Fire Management Plan; and the Bison Management Plan. It is not yet known what the cumulative effects of the other proposed projects will be. However, it is possible that there will be both positive and negative cumulative effects from these proposed actions.

An Aggregation of National Park and National Forest Management Plans (GYCC 1987) for the greater Yellowstone area presents the current situation with respect to ecological, economic, and social conditions. The document incorporates information from the plans of the six national forests, two national parks, and other federal, state, and private agencies and individuals where available. The status of management activities such as timber, minerals, range, transportation, and recreation are shown for the next 10 to 15 years. The existing and proposed conditions in the greater Yellowstone ecosystem follow.

ROADS

The National Park Service is proposing a 20 year project to reconstruct, resurface, restore and rehabilitate the principal park roads. The intent of the proposed parkwide road rehabilitation plan is to preserve and extend the service life of park roads and to enhance their safety. An environmental assessment of this project will be available in the Spring of 1992.

These proposed actions would add approximately 5100 linear feet of roadway to the park road system. The additional roadway would provide for access roads and parking areas for the proposed developments.

Except for new recreational access roads into the Custer and Gallatin national forests, new roads built in forests during the next decade will mainly support timber harvests. Most new local roads and some collector roads will be open only to provide access to areas for management activities, including habitat improvement projects, fire fighting, and resource monitoring. No new roads are planned for national parks in the area.

Road management goals for the greater Yellowstone area include closing roads seasonally to protect them from vehicle damage during wet weather; closing unneeded roads throughout the year; closing roads to protect wildlife from disturbances; and opening roads for timber harvests, mining, recreation, and other uses only when impacts on wildlife and vegetation are acceptable.

RECREATION

Recreation in parks and forests at the 460 developed sites in the area currently totals about 9 million recreation visitor days (one RVD equals 12 hours of use, either continuous or intermittent, by one or more persons). This is projected to increase an average of three percent annually. Yellowstone and Grand Teton national parks have the most use at developed sites and also have the greatest capacity to accommodate this use.

The National Park Service is proposing to replace the 310 campsites that were eliminated when the Fishing Bridge Campground was closed in 1989. These campsites will be replaced at either a new site or at existing campgrounds. An Environmental Impact Statement for this project will be available in late 1992.

Wilderness proposals will cause parks and forests to slightly decrease the number of acres open to motorized use. Some areas currently open to vehicles may sustain adverse resource effects and may subsequently be closed to motorized use.

CONCESSIONS

In national parks no expansion of concession activities is contemplated. About 100 applications for recreational or concession special use permits are received each year by the national forests. Current guidelines encourage private commercial recreational development on private land within and adjacent to national forests, manage recreational special use permits to ensure that 80 percent of designated capacity is available to the user public, prohibit the establishment of new recreational residence tracts, manage potential recreational sites and potential ski area sites to ensure availability and desirability, and authorize expansion of existing facilities where a demonstrated need has been established and where there is no conflict with other resources. An environmental analysis will be made for each proposal.

WILDERNESS

About 53 percent of the national forest and national park lands in the greater Yellowstone area are wilderness or have been recommended to Congress for wilderness designation. All of the nearly four million acres of designated wilderness in the area are within national forests. Major changes to management of these areas is not expected. Current forest management plans specify that 2,072,800 acres will remain undeveloped for at least the next 10 to 15 years. Nearly 8.3 million acres of the greater Yellowstone area are managed as designated wilderness, recommended wilderness, wilderness study areas, or natural areas (undeveloped).

These proposed actions would not have any known cumulative effects upon the wilderness resource of the park.

GRAZING

In national forests, slightly more than one-half of the land is open to cattle and sheep grazing. Most areas in forests are open to grazing by recreational livestock. Reduction in numbers of livestock grazing and using rest-rotation or deferred-rotation grazing have helped to improve the range. More than 30,000 acres of range in poor condition are projected to improve to fair or better condition during the next 15 years.

These proposed actions would not have any cumulative effects upon livestock grazing, which is not permitted in Yellowstone.

MINING

Sixty percent of the land within the greater Yellowstone area has been withdrawn from mineral leasing, or will be recommended for no leasing in the event applications are received. Another 17 percent is open, but with no surface occupancy stipulations; 17 percent is currently leased for oil, gas, or phosphate; and the remaining land is open to leasing with certain stipulations designed to protect other resources, such as wildlife and water quality.

In 1990, Noranda and Crown Butte, Inc., submitted an application to the State of Montana for a permit to mine gold, silver, and copper in an area a few miles northeast of Yellowstone National Park, near Cooke City, Montana. Although this proposal is in the early stages of application, it could cause long-term changes in traffic patterns; in size, demographics, and economics of the local communities; and in visual, water, air, plant, and wildlife resources in the area. An environmental impact statement will be prepared before a mining permit can be granted by the Montana Department of State Lands.

These proposed actions would not have any cumulative effects upon mining.

TIMBER HARVEST

All forests have timber sales of varying size. However, most timber harvesting in the past has been in the Targhee and Gallatin national forests. The majority of future timber harvest is planned for the Targhee National Forest. In 1988 wildfires burned an estimated 39,200 acres on national forest lands considered suitable for timber management (about 2.2 percent of all greater Yellowstone area lands are of this type). Some salvage harvests of fire-damaged timber occurred, as did some artificial reforestation.

These proposed actions would not have any cumulative effects upon timber harvest.

GRIZZLY BEARS

Habitat important for grizzly bears has been uniformly mapped and computerized, and management direction for those areas is being coordinated in accordance with the *Interagency Grizzly Bear Guidelines* (IGBC 1986). Management directions for activities such as timber harvest, road construction, livestock grazing, and mineral leasing are sensitive to other resources, such as soil, water, wildlife, and fish.

Grizzly bear habitat in the greater Yellowstone ecosystem is stratified into different management situations, as described in the *Interagency Grizzly Bear Guidelines*. Habitat components, bear use, and the presence of other uses or activities are the factors that determine the particular management situation for grizzly bear habitat. In recent years, much of the management emphasis in grizzly bear habitat has been aimed at reducing grizzly mortality as a result of bear/human conflict. Programs such as requiring safe camping practices, public and hunter awareness, installation of bear-proof storage and garbage containers, and closure of grizzly bear habitat to bear baiting are some programs that are currently being emphasized.

Direct habitat improvement (vegetative manipulation) has not been undertaken in national forest wilderness areas or in Yellowstone and Grand Teton national parks. However, in these areas visitor use is being managed in ways that positively affect wildlife habitat. Some examples of this include human use restrictions in areas to avoid grizzly bears, bear-proofing of trash cans and an intensive garbage-management program, and careful planning of roads and trails to avoid important habitat areas.

The greater Yellowstone grizzly bear population is the second largest of the recovery populations and is estimated to have a minimum of 200 bears. The *Grizzly Bear Recovery Plan* (revised draft in preparation) is the basic management document guiding the recovery effort. Scientists and managers working on modeling the greater Yellowstone ecosystem grizzly bear population recognize two key factors influencing the potential recovery of the grizzly bear population in the Yellowstone ecosystem: (1) effectiveness of habitat available to grizzly bears, and (2) grizzly bear mortalities. If the greater Yellowstone area maintains sufficient habitat available to support a viable population of grizzlies, and if bear mortalities are minimized, especially those of breeding females, it should be possible to protect and potentially recover this threatened population. The *Grizzly Bear Recovery Plan* outlines actions necessary to accomplish this, and the stated population goals are a means by which to monitor progress toward the two factors.

Based on extensive research and monitoring of Yellowstone area grizzlies, the Interagency Grizzly Bear Study Team monitors the following goals to assess progress toward recovery:

1. There should be fifteen females with cubs-of-the-year annually over a running six-year average.

2. Fifteen of 18 bear management units should be occupied by sows with young, from a running three year sum of observations, and no two of the unoccupied bear management units should be adjacent to each other.

3. Known mortality should not exceed seven total or two adult females annually, averaged over six years.

As of 1991, goals 1 and 3 were being met, and 14 of 18 bear management units were occupied (goal 2). Continual monitoring will be done to ensure that these are not short-term trends. There are no plans or proposals in the near future to remove the grizzly bear in the greater Yellowstone ecosystem from protection under the Endangered Species Act, and additional plans need to be prepared before such an action could be considered.

Because these nine developed areas (especially at Canyon and Grant Village) would continue to account for a relatively high proportion of potential bear mortalities or removals, the implementation of any of the alternatives, including no action, would contribute to grizzly bear mortality in the ecosystem, which needs to be continually minimized. However, at present the bear mortality rate in the ecosystem is not exceeding the goal as stated in the *Grizzly Bear Recovery Plan*. The contributions of the proposed actions to cumulative effects are offset by actions outlined in this plan.

CONCLUSION

After mitigating measures for each proposed action are implemented, the negative environmental impacts that could occur would be minor.

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AGENCIES CONSULTED

The following agencies were contacted in regard to information related to this project:

U.S. Fish and Wildlife Service

Wyoming State Historic Preservation Office

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Yellowstone National Park
Community Planning

April 13, 1992

COST ESTIMATE SUMMARY - CLASS C

	Net Construction Cost	WASO, Admin. & Planning	Total Project Cost
Canyon Village	$6,077,918	$3,403,634	$9,481,552
East Entrance	$2,073,324	$1,157,858	$3,234,385
Grant Village	$6,835,477	$3,827,867	$10,663,344
Grant Village Concessioner RV Site	$1,453,958	$814,216	$2,268,174
Madison Junction	$5,079,767	$2,844,670	$7,924,437
Norris Junction	$3,383,930	$1,895,001	$5,278,931
Northeast Entrance	$2,496,472	$1,398,024	$3,894,496
Roosevelt Lodge	$1,591,381	$891,173	$2,482,554
South Entrance	$2,797,465	$1,566,580	$4,364,045
Tower Junction	$3,420,698	$1,915,590	$5,336,288
West Entrance	$5,684,984	$3,178,911	$8,863,895
TOTALS	$40,895,374	$22,893,524	$63,792,101

Yellowstone National Park
Community Planning

April 13, 1992

Canyon Village - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	2,250	CY	$10.00	$22,500
Trailer Removal	4	EA	$1,000.00	$4,000
Clearing & Grubbing	1.2	AC	$4,500.00	$5,400
Native Seeding & Mulching	1.4	AC	$9,200.00	$12,880
Tree Planting	50	EA	$300.00	$15,000
Shrub Planting	100	EA	$80.00	$8,000
			Sub-total	$67,780
Roads & Walks				
Asphalt Roadway Paving	2140	SY	$50.00	$107,000
Concrete Sidewalks	1100	SF	$8.00	$8,800
Driveways	1000	SY	$40.00	$40,000
Parking Areas	800	SY	$50.00	$40,000
			Sub-total	$195,800
Utilities				
Water Service	1	LS	$30,000.00	$30,000
Sewer Service	1	LS	$35,000.00	$35,000
Electric Service	1	LS	$35,000.00	$35,000
Walkway Lights	4	EA	$1,200.00	$4,800
Satellite Dish	1	LS	$5,000.00	$5,000
			Sub-total	$109,800
Site Improvements				
Community Center	2,000	SF	$125.00	$250,000
Outdoor Recreation Facilities	0.5	AC	$100,000.00	$50,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$300,000

Description	Quantity	Unit	Unit Cost	Total
Housing*				
Rehab Existing Seasonal and Year-round Housing	1	LS	$640,000.00	$640,000
Year-round Housing 4 Quarters, 2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)	4	EA	$250,000.00	$1,000,000
Year-round Housing 8 Quarters, 2 Story, Four-plex Units, Garages & 3 Bedrooms (8,000 SF Per Building @ $110.00)	2	EA	$880,000.00	$1,760,000
Seasonal Housing 22 Quarters, 1 Story, 1 & 2 Bedrooms. (4,400 SF Per Building @ $110.00)	3	EA	$484,000.00	$1,452,000
			Sub-total	$4,852,000
			Construction Subtotal	$5,525,380
			Construction Contingency (10%)	$552,538
			Net Construction	$6,077,918
			Gross Construction (Net x 1.31)	$7,962,073
			Advance & Project Planning (25%)	$1,519,480
			Total Estimate Of Project Cost	$9,481,552

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning

April 13, 1992

East Entrance - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	1,000	CY	$10.00	$10,000
Demolition (structures)	1,170	SF	$4.00	$4,680
Trailer Removal	4	EA	$1,000.00	$4,000
Clearing & Grubbing	0.5	AC	$4,500.00	$2,250
Native Seeding & Mulching	1.4	AC	$9,200.00	$12,880
Tree Planting	50	EA	$300.00	$15,000
Shrub Planting	150	EA	$80.00	$12,000
Erosion Control Netting	0.5	AC	$13,300.00	$6,650
			Sub-total	$67,460
Roads & Walks				
Asphalt Roadway Paving	3,600	SY	$50.00	$180,000
Concrete Sidewalks	2,880	SF	$11.00	$31,680
Driveways	130	SY	$40.00	$5,200
Parking Areas	350	SY	$50.00	$17,500
			Sub-total	$234,380
Utilities				
Water Service	1	LS	$50,000.00	$50,000
Sewage Service	1	LS	$100,000.00	$100,000
Electric Service	1	LS	$50,000.00	$50,000
Walkway Light	4	EA	$1,200.00	$4,800
Utility Light	2	EA	$1,800.00	$3,600
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$313,400
Site Improvements				
Community Center	1,200	SF	$125.00	$150,000
Picnic Tables	6	AC	$600.00	$3,600
			Sub-total	$153,600

Description	Quantity	Unit	Unit Cost	Total
Housing*				
Year-round Housing	2	EA	$250,000.00	$500,000
2 Quarters,1 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)				
Seasonal Housing	2	EA	$308,000.00	$616,000
9 Quarters, 1 Story,			Sub-total	$1,116,000
1 & 2 Bedrooms (2,800 SF Per Building @ $110.00)				
			Construction Subtotal	$1,884,840
			Construction Contingency (10%)	$188,484
			Net Construction	$2,073,324
			Gross Construction (Net x 1.31)	$2,716,054
			Advance & Project Planning (25%)	$518,331
			Total Estimate Of Project Cost	$3,234,385

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning

April 13, 1992

Grant Village - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	2,750	CY	$10.00	$27,500
Trailer Removal	7	LS	$1,000.00	$7,000
Clearing & Grubbing	1	AC	$4,500.00	$4,500
Native Seeding & Mulching	2.5	AC	$9,200.00	$23,000
Tree Planting	150	EA	$300.00	$45,000
Shrub Planting	100	EA	$80.00	$8,000
Erosion Control Netting	0.25	AC	$1,200.00	$300
			Sub-total	$115,300
Roads & Walks				
Asphalt Roadway Paving	2,880	SY	$50.00	$144,000
Concrete Sidewalks	7,740	SF	$8.00	$61,920
Driveways	600	SY	$40.00	$24,000
Parking Areas	1,045	SY	$50.00	$52,250
			Sub-total	$282,170
Utilities				
Water Service	1	LS	$100,000.00	$100,000
Sewage Service	1	LS	$200,000.00	$200,000
Electric Service	1	LS	$100,000.00	$100,000
Walkway Light	8	EA	$1,200.00	$9,600
Satellite Dish	1	LS	$5,000.00	$5,000
			Sub-total	$414,600
Site Improvements				
Community Center	2,000	SF	$125.00	$250,000
Outdoor Recreation Facilities	0.75	AC	$100,000.00	$75,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$325,000

Description	Quantity	Unit	Unit Cost	Total
Housing*				
Rehab Existing Year-round Housing	1	LS	$39,000.00	$39,000
Year-round Housing 3 Quarters, 2 Story, Single Family Units, Garages & 3 Bedroom (2,000 SF Per Building @ $125.00)	3	EA	$250,000.00	$750,000
Year-round Housing 4 Quarters, 2 Story, Duplex Units, Garages & 3 Bedrooms (4,000 SF Per Building @ $125.00)	2	EA	$500,000.00	$1,000,000
Garages for Existing Four-Plex (800 SF Per Garage @ $40.00)	2	EA	$32,000.00	$64,000
Seasonal Housing 32 Quarters, 2 Story, 1 & 2 Bedrooms (4,600 SF Per Building @ $110.00)	4	EA	$506,000.00	$2,024,000
Redevelop Existing Seasonal Housing 20 Quarters	20	EA	$60,000.00	$1,200,000
			Sub-total	$5,077,000
			Construction Subtotal	$6,214,070
*Cost estimates include the cost for exotic plant prevention and control			Construction Contingency (10%)	$621,407
			Net Construction	$6,835,477
			Gross Construction (Net x 1.31)	$8,954,475
			Advance & Project Planning (25%)	$1,708,869
			Total Estimate Of Project Cost	$10,663,344

Yellowstone National Park
Community Planning

April 13, 1992

Grant Village Concessioner - Class C Cost Estimate
RV Site

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	1,460	CY	$10.00	$14,600
Clearing & Grubbing	3.5	AC	$4,500.00	$15,750
Native Seeding & Mulching	1.5	AC	$9,200.00	$13,800
			Sub-total	$44,150
Roads & Walks				
Asphalt Roadway Paving	8,750	SY	$50.00	$437,500
Trailer Site; Gravel	5,070	SY	$9.00	$45,630
			Sub-total	$483,130
Utilities				
Water Line	1	LS	$65,000	$65,000
Sewer Line	1	LS	$80,000	$80,000
Electric Line	1	LS	$50,000	$50,000
Walkway Light	10	EA	$1,200.00	$12,000
RV Hook-up	95	EA	$500.00	$47,500
			Sub-total	$254,500
Site Improvements				
Comfort Stations	3	EA	$180,000.00	$540,000
(900 SF Per Building @ $200.00)			Sub-total	$540,000
			Construction Subtotal	$1,321,780
			Construction Contingency (10%)	$132,178
			Net Construction	$1,453,958
			Gross Construction (Net x 1.31)	$1,904,685
			Advance & Project Planning (25%)	$363,490
			Total Estimate Of Project Cost	$2,268,174

Yellowstone National Park
Community Planning

April 13, 1992

Madison Junction - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	3,000	CY	$10.00	$30,000
Demolition (structures)	11,620	SF	$4.00	$46,480
Demolition (Roadway)	3,430	SY	$6.00	$20,580
Trailer Removal	7	EA	$1,000.00	$7,000
Clearing & Grubbing	1	AC	$4,500.00	$4,500
Native Seeding & Mulching	0.8	AC	$9,200.00	$7,360
Tree Planting	100	EA	$300.00	$30,000
Shrub Planting	150	EA	$80.00	$12,000
Erosion Control Netting	1.5	AC	$1,200.00	$1,800
			Sub-total	$159,720
Roads & Walks				
Asphalt Roadway Paving	2,730	SY	$50.00	$136,500
Concrete Sidewalks	3,600	SF	$8.00	$28,800
Driveways	570	SY	$40.00	$22,800
Parking Areas	850	SY	$50.00	$42,500
			Sub-total	$230,600
Utilities				
Drain Inlet	4	EA	$800.00	$3,200
Drain Pipe (15" CMP)	450	LF	$25.00	$11,250
Water Service	1	LS	$100,000.00	$100,000
Sewage Service	1	LS	$200,000.00	$200,000
Electric Service	1	LS	$100,000.00	$100,000
Walkway Lights	6	EA	$1,200.00	$7,200
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$526,650

Description	Quantity	Unit	Unit Cost	Total
Site Improvements				
Community Center	2,000	SF	$125.00	$250,000
Outdoor Recreation Facilities	0.5	AC	$100,000.00	$50,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$300,000
Housing*				
Rehab Existing Year-round House	1	LS	$15,000.00	$15,000
Year-round Housing 8 Quarters, 2 Story, Duplex Units, Garages & 3 Bedrooms (4,000 SF Per Building @ $125.00)	4	EA	$500,000.00	$2,000,000
Seasonal Housing 16 Quarters, 2 Story, 1 & 2 Bedrooms (4,600 SF Per Building @ $110.00)	2	EA	$506,000.00	$1,012,000
Seasonal Housing 5 Quarters, 1 1/2 Story, 1 & 2 Bedrooms (3,400 SF Per Building @ $110.00)	1	EA	$374,000.00	$374,000
			Sub-total	$3,401,000
			Construction Subtotal	$4,617,970
			Construction Contingency (10%)	$461,797
			Net Construction	$5,079,767
			Gross Construction (Net x 1.31)	$6,654,495
			Advance & Project Planning (25%)	$1,269,942
			Total Estimate Of Project Cost	$7,924,437

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning

April 13, 1992

Norris Junction - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	1,500	CY	$10.00	$15,000
Trailer Removal	3	LS	$1,000.00	$3,000
Clearing & Grubbing	0.8	AC	$4,500.00	$3,600
Native Seeding & Mulching	2	AC	$9,200.00	$18,400
Tree Planting	50	EA	$300.00	$15,000
Shrub Planting	50	EA	$80.00	$4,000
			Sub-total	$59,000
Roads & Walks				
Asphalt Roadway Paving	2,470	SY	$50.00	$123,500
Concrete Sidewalks	4,050	SF	$8.00	$32,400
Driveways	610	SY	$40.00	$24,400
Parking Areas	660	SY	$50.00	$33,000
			Sub-total	$213,300
Utilities				
Water Service	1	LS	$200,000.00	$200,000
Sewage Service	1	LS	$500,000.00	$500,000
Electric Service	1	LS	$100,000.00	$100,000
Auxiliary Power	1	LS	$50,000.00	$50,000
Walkway Lights	5	EA	$1,200.00	$6,000
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$961,000
Site Improvements				
Community Center	1,200	SF	$125.00	$150,000
Outdoor Recreation Facilities	0.25	AC	$100,000.00	$25,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$175,000

Description	Quantity	Unit	Unit Cost	Total
Housing*				
Rehab Existing Seasonal Housing	1	LS	$60,000.00	$60,000
Year-round Housing 3 Quarters, 2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)	3	EA	$250,000.00	$750,000
Seasonal Housing 12 Quarters, 1 Story, 1 & 2 Bedrooms (2,600 SF Per Building @ $110.00)	3	EA	$286,000.00	$858,000
			Sub-total	$1,668,000
			Construction Subtotal	$3,076,300
			Construction Contingency (10%)	$307,630
			Net Construction	$3,383,930
			Gross Construction (Net x 1.31)	$4,432,948
			Advance & Project Planning (25%)	$845,983
			Total Estimate Of Project Cost	$5,278,931

*Cost estimates include the cost for exotic plant prevention and control

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Yellowstone National Park
Community Planning

April 13, 1992

Northeast Entrance - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	1,000	CY	$10.00	$10,000
Demolition (structures/trailers)	1	LS	$10,000.00	$10,000
Demolition (Roadway)	1,560	SY	$6.00	$9,360
Clearing & Grubbing	0.3	AC	$4,500.00	$1,350
Native Seeding & Mulching	0.8	AC	$9,200.00	$7,360
Tree Planting	60	EA	$300.00	$18,000
Shrub Planting	200	EA	$80.00	$16,000
			Sub-total	$72,070
Roads & Walks				
Asphalt Roadway Paving	1,380	SY	$50.00	$69,000
Concrete Sidewalks	2,000	SF	$8.00	$16,000
Driveways	150	SY	$40.00	$6,000
Parking Areas	120	SY	$50.00	$6,000
			Sub-total	$97,000
Utilities				
Drain Inlet	4	EA	$800.00	$3,200
Drain Pipe (15" CMP)	375	LF	$30.00	$11,250
Water Service	1	LS	$75,000.00	$75,000
Sewage Service	1	LS	$100,000.00	$100,000
Electric Service	1	LS	$50,000.00	$50,000
Auxiliary Power	1	LS	$50,000.00	$50,000
Walkway Lights	3	EA	$1,200.00	$3,600
Utility Light	3	EA	$1,800.00	$5,400
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$403,450

Description	Quantity	Unit	Unit Cost	Total
Site Improvements				
Community Center	2,000	SF	$125.00	$250,000
Outdoor Recreation Facilities	0.25	AC	$100,000.00	$25,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$275,000
Housing*				
Rehab Existing Seasonal House	1	LS	$100,000.00	$100,000
Year-round Housing 3 Quarters, 2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF @ $125.00 per Building)	3	EA	$250,000.00	$750,000
Seasonal Housing	2	EA	$286,000.00	$572,000
7 Quarters, 1 Story, 1 & 2 Bedrooms (2,600 SF Per Building @ $110.00)			Sub-total	$1,422,000
			Construction Subtotal	$2,269,520
			Construction Contingency (10%)	$226,952
			Net Construction	$2,496,472
			Gross Construction (Net x 1.31)	$3,270,378
			Advance & Project Planning (25%)	$624,118
			Total Estimate Of Project Cost	$3,894,496

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning
Roosevelt Lodge - Class C Cost Estimate

April 13, 1992

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	2,000	CY	$10.00	$20,000
Native Seeding & Mulching	1	AC	$9,200.00	$9,200
Tree Planting	45	EA	$300.00	$13,500
Shrub Planting	50	EA	$80.00	$4,000
			Sub-total	$46,700
Roads & Walks				
Asphalt Roadway Paving	800	SY	$50.00	$40,000
Concrete Sidewalks	9,720	SF	$8.00	$77,760
Parking Areas	685	SY	$50.00	$34,250
			Sub-total	$152,010
Utilities				
Water Service	1	LS	$25,000.00	$25,000
Sewer Service	1	LS	$25,000.00	$25,000
Electric Service	1	LS	$10,000.00	$10,000
			Sub-total	$60,000
Housing*				
Concessioner Dormitories	9	EA	$132,000.00	$1,188,000
70 Quarters, 1 Story Cabins			Sub-total	$1,188,000
8 Quarters per Building				
(1,200 SF Per Building @ $110.00)			Construction Subtotal	$1,446,710
			Construction Contingency (10%)	$144,671
			Net Construction	$1,591,381
*Cost estimates include the cost for			Gross Construction (Net x 1.31)	$2,084,709
exotic plant prevention and control			Advance & Project Planning (25%)	$397,845
			Total Estimate Of Project Cost	$2,482,554

Yellowstone National Park
Community Planning

April 13, 1992

South Entrance - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	500	CY	$10.00	$5,000
Demolition (structures)	1,170	SF	$4.00	$4,680
Trailer Removal	5	EA	$1,000.00	$5,000
Clearing & Grubbing	0.5	AC	$4,500.00	$2,250
Native Seeding & Mulching	1.4	AC	$9,200.00	$12,880
Tree Planting	50	EA	$300.00	$15,000
Shrub Planting	40	EA	$80.00	$3,200
			Sub-total	$48,010
Roads & Walks				
Asphalt Roadway Paving	3,600	SY	$50.00	$180,000
Concrete Sidewalks	2,880	SF	$8.00	$23,040
Driveways	130	SY	$40.00	$5,200
Parking Areas	350	SY	$50.00	$17,500
			Sub-total	$225,740
Utilities				
Water Service	1	LS	$50,000.00	$50,000
Sewage Service	1	LS	$100,000.00	$100,000
Electric Service	1	LS	$50,000.00	$50,000
Walkway Lights	4	EA	$1,200.00	$4,800
Utility Light	2	EA	$1,800.00	$3,600
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$313,400

Description	Quantity	Unit	Unit Cost	Total
Site Improvements				
Community Center	1,200	SF	$125.00	$150,000
Outdoor Recreation Facilities	0.25	AC	$100,000.00	$25,000
(Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)			Sub-total	$175,000
Housing*				
Rehab Existing Seasonal and Year-round Housing	1	LS	$163,000.00	$163,000
Year-round Housing 3 Quarters,1 1/2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)	3	EA	$250,000.00	$750,000
Two Car Garages for Existing Duplex (400 SF Per Garage @ $40.00)	2	EA	$16,000.00	$32,000
Seasonal Housing	2	EA	$418,000.00	$836,000
9 Quarters, 1 Story, 1 & 2 Bedrooms (3,800 SF Per Building @ $110.00)			Sub-total	$1,781,000
			Construction Subtotal	$2,543,150
			Construction Contingency (10%)	$254,315
			Net Construction	$2,797,465
			Gross Construction (Net x 1.31)	$3,664,679
			Advance & Project Planning (25%)	$699,366
			Total Estimate Of Project Cost	$4,364,045

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning

April 13, 1992

Tower Junction - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	1,750	CY	$10.00	$17,500
Demolition (Roadway)	1,560	SY	$6.00	$9,360
Trailer Removal	5	EA	$1,000.00	$5,000
Native Seeding & Mulching	1.6	AC	$9,200.00	$14,720
Tree Planting	75	EA	$300.00	$22,500
Shrub Planting	200	EA	$80.00	$16,000
Erosion Control Netting	0.15	AC	$13,300.00	$1,995
Fence Removal	1,140	LF	$5.00	$5,700
Corral Fencing Replacement	780	LF	$10.00	$7,800
			Sub-total	$100,575
Roads & Walks				
Asphalt Roadway Paving	2,855	SY	$50.00	$142,750
Concrete Sidewalks	3,600	SF	$8.00	$28,800
Driveways	140	SY	$40.00	$5,600
Parking Areas	200	SY	$50.00	$10,000
			Sub-total	$187,150
Utilities				
Water Service	1	LS	$50,000.00	$50,000
Sewage Service	1	LS	$100,000.00	$100,000
Electric Service	1	LS	$15,000.00	$15,000
Auxiliary Power	1	LS	$50,000.00	$50,000
Walkway Lights	5	EA	$1,200.00	$6,000
Satellite Dish	1	LS	$5,000.00	$5,000
Fire Protection	1	LS	$100,000.00	$100,000
			Sub-total	$326,000

Description	Quantity	Unit	Unit Cost	Total
Site Improvements				
Community Center	1,200	SF	$125.00	$150,000
Outdoor Recreation Facilities (Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)	0.5	AC	$100,000.00	$50,000
			Sub-total	$200,000
Housing*				
Rehab Existing Seasonal and Year-round Housing	1	LS	$182,000.00	$182,000
Year-round Housing 3 Quarters, 1 1/2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)	3	EA	$250,000.00	$750,000
Seasonal Housing 8 Quarters, 2 Story, 1 & 2 Bedrooms (4,800 SF Per Building @ $110.00)	1	EA	$528,000.00	$528,000
Seasonal Housing 12 Quarters, 1 1/2 Story, 1 & 2 Bedrooms (3,800 SF Per Building @ $110.00)	2	EA	$418,000.00	$836,000
			Sub-total	$2,296,000
			Construction Subtotal	$3,109,725
			Construction Contingency (10%)	$310,973
			Net Construction	$3,420,698
			Gross Construction (Net x 1.31)	$4,481,114
			Advance & Project Planning (25%)	$855,174
			Total Estimate Of Project Cost	$5,336,288

*Cost estimates include the cost for exotic plant prevention and control

Yellowstone National Park
Community Planning

April 13, 1992

West Entrance - Class C Cost Estimate

Description	Quantity	Unit	Unit Cost	Total
Sitework				
Excavation / Embankment	2,500	CY	$10.00	$25,000
Trailer Removal	7	EA	$1,000.00	$7,000
Demolition (Roadway)	5,415	SY	$6.00	$32,490
Clearing & Grubbing	1.8	AC	$4,500.00	$8,100
Native Seeding & Mulching	2	AC	$9,200.00	$18,400
Tree Planting	130	EA	$300.00	$39,000
Shrub Planting	50	EA	$80.00	$4,000
			Sub-total	$133,990
Roads & Walks				
Asphalt Roadway Paving	4,800	SY	$50.00	$240,000
Concrete Sidewalks	2,700	SF	$8.00	$21,600
Driveways	1,020	SY	$40.00	$40,800
Parking Areas	325	SY	$50.00	$16,250
			Sub-total	$318,650
Utilities				
Water Service	1	LS	$55,000.00	$55,000
Sewer Service	1	LS	$65,000.00	$65,000
Electric Service	1	LS	$65,000.00	$65,000
Walkway Lights	4	EA	$1,200.00	$4,800
Satellite Dish	1	LS	$5,000.00	$5,000
			Sub-total	$194,800
Site Improvements				
Community Center (Rehab Existing Residence)	1	LS	$60,000.00	$60,000
Outdoor Recreation Facilities (Volleyball, Basketball, Picnic, Play Area, Benches & Landscaping)	0.5	AC	$100,000.00	$50,000
			Sub-total	$110,000

Description	Quantity	Unit	Unit Cost	Total
Housing*				
Rehab Existing Seasonal and Year-round Housing	1	LS	$182,000.00	$182,000
Year-round Housing 8 Quarters, 2 Story, Single Family Units, Garages & 3 Bedrooms (2,000 SF Per Building @ $125.00)	8	EA	$250,000.00	$2,000,000
Year-round Housing 4 Quarters, 2 Story, Fourplex Unit, Garages & 3 Bedrooms (8,000 SF Per Building @ $125.00)	1	EA	$1,000,000.00	$1,000,000
Year-round Housing 2 Quarters, 2 Story, Duplex Units, Garages & 3 Bedrooms (4,000 SF Per Building @ $125.00)	1	EA	$500,000.00	$500,000
Seasonal Housing 9 Quarters, 1 Story, 1 & 2 Bedrooms (2,200 SF Per Building @ $110.00)	3	EA	$242,000.00	$726,000
			Sub-total	$4,408,000
			Construction Subtotal	$5,165,440
			Construction Contingency (10%)	$516,544
			Net Construction	$5,681,984
			Gross Construction (Net x 1.31)	$7,443,399
			Advance & Project Planning (25%)	$1,420,496
			Total Estimate Of Project Cost	$8,863,895

*Cost estimates include the cost for exotic plant prevention and control

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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